COMPUTERWORLD

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TWA, Burroughs Trade Suits on Contract

By Edward J. Bride
CW Staff Writer

NEW YORK – Trans World Airlines, one of the largest users of Burroughs computers, has filed a $70 million suit against the manufacturer, charging that "misrepresentation and breach of contract" made a shambles of the airline's passenger reservation system.

Burroughs countered by filing a suit for $11.5 million to recover the balance due in the $38 million contract, which was first announced almost four years ago and which was never fully consummated.

TWA would not elaborate on its charges of breach of contract and misrepresentation, although there were reports earlier this year that software problems were delaying installation of the massive system [CW, March 4].

Burroughs said the contract called for TWA to develop the application packages, and the manufacturer was to provide "equipment hardware and basic system software."

Whether the basis of the complaint was the operating system or applications was not discernible from first reports.

The official announcement from TWA stated the airline had "discontinued all efforts" to use the B8300 system as an automated passenger reservation and management information system, and that an "advanced" version of an IBM system, utilizing 360/65 or 360/75 computers, would be implemented in 1971.

Last spring, United Air Lines cancelled a contract with Univac worth approximately the same as the TWA-Burroughs agreement, and turned to IBM to implement a substitute system.

Burroughs "emphatically" denied the charges, and called the suit a "precipitous action." The company noted the equipment and services were selected by TWA as "elements of the system being programmed and implemented by TWA personnel." Burroughs also claimed its equipment "meets or exceeds all requirements and intended use conditions of the TWA system."

TWA has its headquarters here, and filed the suit in the U.S. District Court for the Southern District of New York. Burroughs' headquarters are in Detroit, and the countersuit was filed in the Eastern District of Michigan, federal court.

Burroughs claimed the "major components" of the system, plus some related equipment, were sold by TWA to CIT Corp. on a lease-back arrangement, in 1968 and 1969.

When TWA informed the manufacturer that "certain delays in the full operational use of the system" might have been caused by Burroughs' non-compliance with the purchase contract, and that the airline expected Burroughs to "make good any losses suffered by TWA as a result," Burroughs disagreed and demanded the balance plus interest, or $11.5 million, the manufacturer contended.

Burroughs' statement also reported the company was first informed of the suit at a meeting of "top management. . .mutually arranged to continue good faith negotiations with TWA," last Thursday.

The original contract was never officially cancelled, and TWA officials could only "assume" that their lawsuit and concurrent press statements constituted such cancellation.

L.A. Braces for Nov. 3 Vote, Adds Innovations, Security

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES – This city is taking no chances for the Nov. 3 election when it once again will use the controversial Votomatic punch card vote count system.

According to one source the county this time is in an "overkill" situation in that there are experts watching experts watching experts.

An early foulup in the mailing of the sample ballots (pages listing the top offices were blank in a few ballots) caused shock waves as political activists feared a repeat of the multiple errors that lead to the disaster of the last primary election.

John Greiner, head of the Economic Research Association (ERA) task force, a firm hired as consultants to TRW Systems which is overseeing the election, went on TV to assure people that there would be an audit trail that would trace the passage of each vote through the system.

In the county election twenty-four 360/20s are brought into air conditioned county facilities just for the election.

Each has its own card reader and power supplies have to be set up for them.

Back-up power supplies are not provided as the locations are on independent power systems. The 20s are used to convert the ballots from card to tape.

The actual counting of the votes will be done by one 360/50. Backup for this computer is provided in two different locations. There will be more than 1,000 county employees in the tally center; 76 of these will be trained computer personnel and 48 will be clerical.

In addition, there are 37,000 precinct officers in the 7,200 vote centers and 140 sheriffs will be used to move the vote from collection centers to the data processing site.

This does not include helicopter crews used to bring the vote in from remote areas or all the volunteer representatives of the electorate who are observing the vote process from start to finish.

As far as the magnitude of the computerized operation goes, it extends throughout the whole vote process, not just the vote count. For example, the voter registration tape file is approxi-

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Poor Preparation Cited

Did DPMA Exam Fail 1st Test?

By Michael Merritt
CW Staff Writer

PARK RIDGE, ILL. – "Errors are errors. It's just a damn shame when they occur.

"[The Registered Business Programmer Examination] has been under development for the better part of three and one-half years. It was tested three times before it satisfied the judgment of the certification council."

So said DPMA Education Director Donald J. MacPherson after DPMA's first offering of its exam. Bradley Bealle of Sperry and Hutchinson Co., who took the RBPE said: "The test was unbelievably bad. It was vague, general, highly subjective, and loaded with typos . . . . . Anyone who flunks is a complete dummy . . . . . I will be appalled if more than 5% of those tested fail to buy the credential they failed to achieve through diligent on-the-job performance."

And Daniel J. Cerny of Central Telephone and Utilities Corp. claimed: "It was very clear that the exam questions had not been proofread . . . . I would never advise anyone to waste their money on DPMA-sponsored exams if they are as poorly organized as this one was."

DPMA Executive Director R. Calvin Eilliott said so far he has received only eight letters from people who sat for the RBPE, and he himself has discovered a total of six errors on the exam. He said that he thought four questions would be eliminated from the scoring of the test, out of a total of 115.

"There are always a few errors," he said. "It's part of doing business, you might say." He also noted that based on the DPMA's experience with the CDP he had expected more response than he had received. "We are used to people who take exams and have to write about them."

"I'm not 150% pleased with the RBPE, of course not, but all in all it came off very well."

He added that the exam had been proofed by an outside firm, a bonded company.

A CW correspondent who took the exam noted: "Less than a dozen pages of the examination seemed free of such [typographical errors] . . . . Some were so serious as to make questions meaningless or nonsense, and make a number of others just

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Case Rating System Defended, Doesn't Lead to Trial Delays

CW Washington Bureau

WASHINGTON, D.C. – The U.S. Attorney's Office here denied last week that its new computerized case rating system would cause any defendant to wait longer for a trial [CW, Oct. 21].

Assistant U.S. Attorney Charles Work said that while the ratings helped prosecutors to single out certain cases for priority treatment the system did not affect the order in which trials were scheduled. The trial calendars are made up by the court on the basis of oldest case first, he said, and the prosecution rarely asks for postponements.

A judge and a defense attorney confirmed that very few postponements are sought by the prosecution.

Careful Preparation

The effect of the system is that the prosecution carefully prepares for major cases and makes little or no preparation for low-rated cases.

But it does not mean the low-rated cases will be delayed, Work said, just that the prosecutor may not get a chance to study the case until the day the trial is called.

The caseload here is staggering. For example, in 1969 over 25,000 cases were filed in the Court of General Sessions, representing a defendant population of 12,000 to 13,000 people. In February 1970, the average intake into the system was 60 cases daily.

The trial calendar for misdemeanors averaged 62 cases a day while the felony preliminary hearing calendar was reaching 26 cases daily.

The system "ensures that the most serious cases will be ready for prosecution on a given day, and minimizes the number of top priority cases which will be lost through a DWP [dismissed

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Consider Using 370? Better Check Hidden Costs

By Frank Piasta
CW Staff Writer

The user who is going to install an IBM 370 may be in for some surprises, not all of them pleasant. He might wind up spending more money than he anticipated.

The extra cost may result, in part, from a few items that are not too apparent in the 370 specifications.

The user considering the installation of the 3330 Disk Storage unit will have to purchase rather than lease his 3336 disk packs. Previous disk packs, the 1316 for the 2311 drive and the 2316 for the 2314 drive, were available on a lease basis.

In addition, the price of the 3336 pack may raise a few eyebrows. Compared to the $360 price of the 1316, and the $525 tag on the 2316, the 3336 will cost an even $1,000, each.

The 370/165 user will have to make another capital investment. The motor/generator set for that system, needed to supply a source of 400 Hz power for the CPU, will require an investment of $15,000. The equipment is not available for lease.

Another unusual cost associated with the 165, but available on a lease, is for the power and coolant distribution system. (The 165 is a water-cooled system). This unit carries a price of $110,400, or $2,300/mo lease, with a monthly maintenance charge of $110.

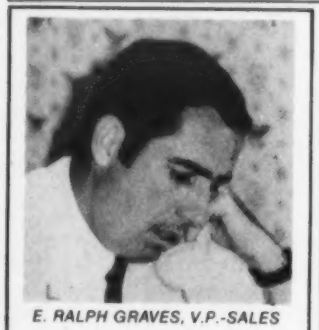
How Compatible?

The user who plans on the installation of the 3330 may find that his software is not as compatible as he thinks.

The new storage device will not be supported under DOS, necessitating a change in operating systems, in some cases, to the more complex procedures of OS with its higher core requirements.

Another item that may surprise the user when he configures his 165 is the relatively high cost of the operator's console. This required piece of equipment will cost $3,100/mo, or $148,800 plus $460/mo for maintenance if purchased.

An unknown factor now is just how much the software will cost the 370 user. Presently, the 370 is limited to the use of 360 software, part of the cost of which was written off during the "bundled" era. It is easy to forget that this situation will no longer exist for any new 370 software products. The 370 software development costs will undoubtedly be passed on to the user.



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Panama Canal Due for a Change?

Methods of scheduling ships through the Panama Canal have changed little since the canal opened in 1914, although traffic is now up to 15,000 vessels annually. Above, a clerk updates information on the operations board in the canal's marine traffic control center. A computer-based system may soon replace these and other manual operations, according to a study being conducted by Computer Sciences Corp. Major aims of the study include increasing canal traffic capacity and revenues, and improving navigational safety.

L.A. Gears for Nov. 3 Election, Taps All Its Resources

(Continued from Page 1)

mately 30 reels of tape and it takes 18 hours of computer time just to sort it into precinct sequence.

In addition, the configuration of the ballot style is determined by the computers. The complexity of the vote count program itself is shown in that it takes over 24,000 basic Assembly Language statements.

Security Tightened

Security measures have been tightened throughout the entire procedure. An independent audit of the program is being done by Isaacs & Associates.

Herbert Isaacs, president, is a former System Development Corp. manager and partner in the recently dissolved Isaacs-Dobbs firm. His function is to examine the program and the procedures and techniques used to certify them in the same manner that a certified public accountant would a business system.

His firm will, in effect say, "The program is clean and it does what it is supposed to do." Also approving the program are representatives of the two major parties who have been in on the development of it.

As fraud can occur at all levels of the computerized vote count, IBM has been asked to certify that the operating systems supplied for the computers are clean and unadulterated by any extra command or statements.

As far as personnel security goes, color-coded badges will be required for admittance to the counting center and will designate, by color, to which area the person is to be admitted.

According to Greiner of ERA, fraud could have occurred in the vote count method at the vote count level, the operating system, in the data preparation tables or in the card-to-tape operation.

Efforts have been made to protect each of these steps.

In addition, there is the remote possibility of changing the vote count through an action by one of the operators. There will be a supervisor for each two operators. "The major parties will be represented by 20 to 25 computer people and 40 to 45 others for each party."

Other steps to be taken are a core dump before the count starts to assure that nothing is in the computers and a core dump at the end of the count to assure that the program that is in is as it should be.

As Greiner puts it, "We have had a lot of computer gurus who have said a program written by a man could be subverted by a man. This is true, but when a program is working right it is much more secure than 100,000 volunteers manually counting the vote."

Heightened Training

Other innovations in the procedure are heightened training steps. Each operator will have two weeks' hands-on training with the 360/20. Those inspecting the cards will be given more training than in the past.

The political party observers are being given training so that they have a better idea of just what they are observing.

Even the citizens committee is taking a "walk through" the entire election arrangements to see "what will happen and how" on election night.

In addition to hiring ERA and Isaacs, eight IBM employees will also follow the election count proceedings.

Virginia Bans Votomatic

RICHMOND, Va. – Virginia has banned the use of punched card vote counting systems although there has been considerable agitation in their favor. The decision to use nothing but mechanical voting machines was made by the state Board of Elections after a prolonged study by the Election Laws Reform Committee.

A committee member said that it had studied the Atlanta, Ga. election from precinct vote casting through the counting rooms and decided there were too many opportunities for fraud. Atlanta was the first county to use the Votomatic computer system.

"For example," a committee member told *Computerworld*: "Absentee ballots are opened and transferred to punched cards without any supervisors present. Also, when you shift the count to the computer center you are at the mercy of the center."

The committee asked companies in the field for some safeguard recommendations that were practical and feasible but received none – just a lot of theories. "Furthermore," said the committee member, "it really isn't cheaper."

Ruth Davis Named Head of NBS Center

GAITHERSBURG, Md. – Dr. Ruth M. Davis has been appointed director of the Center for Computer Sciences and Technology at the National Bureau of Standards here, replacing Dr. H.R.J. Grosch, who was relieved and appointed Special Research Fellow last spring [CW, May 20].

The announcement was made last week by Dr. Lewis Branscomb, director of NBS. The center provides leadership and coordination for government efforts in the development of voluntary commercial information processing standards.

Dr. Davis is considered a leader in many fields of information science, including systems design and artificial intelligence. She comes to NBS from the National Library of Medicine, where she was director of the Lister Hill National Center for Biomedical Communications.

Reaction From a Lady

Navy Cmdr. Grace M. Hopper called the appointment "terrific . . . she usually gets things done."

Cmdr. Hopper said she could not comment on a possibility the government is indicating a greater interest in larger systems, but noted Dr. Davis' "broad experience" in command and control, environment, and medicine.

Cmdr. Hopper noted that "most of the men have been confined to one area, one department, and didn't broaden contacts." She said Dr. Davis was "level headed . . . won't make sudden remarks without thinking," and indicated a hope that the appointment was "a sign of the times."

Before joining Lister Hill, Dr. Davis was a staff assistant at the Pentagon.

Uniqueness Cited

Basic Standardization Proposal Gets Mixed Reviews

By Don Leavitt
CW Staff Writer

DENVER, Colo. – In a move that has drawn both praise and skepticism, John A.N. Lee, visiting professor at the University of Denver, has formally proposed that the Basic Language be considered for standardization by the American National Standards Institute (Ansi).

Lee said that, without standards, Basic probably will lose its unique role as a beginner's language.

DeFacto Standard

Lee admitted in his proposal that the current Basic manual published by Dartmouth College, as amended by newsletter, is a de facto standard, but he said, this apparently is not enough.

Although most variants are compatible with the primitive features of the language, such elements as formatting, character string data type and extended character sets have not been universally accepted, he said.

Basic is an acronym for Beginner's All purpose Symbolic Interpretive Coding. It is a language developed in the mid 1960s by then Profs. J.G. Kemeny and T.E. Kurtz at Dartmouth College, Hanover, N.H., designed originally for beginning students.

Basic differs from other programming languages such as Fortran and Algol in that its specific purpose was to provide a vehicle for education in programming. Moreover, Basic was developed specifically for remote console, time-sharing systems though certain reimplementations have been in batch processing systems.

Lee said that, currently, students have to be aware of which variation of the language they are using. Enlarging on the language's original form defeats the purpose of a beginners' language, he added.

At Dartmouth, Kemeny, now president of the college, reacted to Lee's proposal, saying that he is "very much in favor" of standardization of the language.

Lee is emphatic in his position. He said he hoped Basic stays "far enough behind the state of the art so that it does not get too complicated and become ineffective as a teaching medium.

He said, however, that there may be a need for two standards, for Basic and Super Basic, to reflect extensions of the language that have already been developed.

Commenting on Lee's proposal, Calvin Mooers, the inventor of the Trac Language, agreed that Basic is a tremendously valuable language, and that a standard would be valuable.

Mooers wondered, however, whether Ansi – or any group – can set up meaningful standards for Basic.

But, he said, there are important elements of internal housekeeping, including automatic rounding and word size, that differ sharply from one standard Fortran compiler to another. Under these circumstances, Mooers said, the calculation results can vary, depending on the compiler being used. If such apparent, but really incomplete, standardization develops from Lee's proposal, Mooers said the standard would be a "hoax."

'Stack' Zeroes In on Pollutants

By Don Leavitt
CW Staff Writer

PHILADELPHIA – Sun Oil Co. has developed a software package to calculate the potential pollution damage that can be caused by industrial smokestack emissions.

As a public service, the company said that its Atmospheric Stack Dispersion Program (Stack) will be available at no charge to municipal governments and at a nominal charge to industrial users.

Written in Fortran IV, Stack works with user-supplied information to determine what each smokestack will emit and in what locations.

The input data includes detailed atmospheric conditions such as wind, temperature, and the humidity, and types of waste materials being output by the stacks. According to Sun, the potential pollution generated by as many as 15 stacks can be predicted with each use of the Stack program.

The basic output of the program is a table of pollution concentrations either downwind or crosswind from the stack. An optional output can present the same data graphically, on a plotter, the company said.

New tables or plots can be generated as often as required to reflect changes in either weather conditions or materials entering the stacks, the company said.

Because of inconsistencies of the weather, Stack is described by Sun as a predictor rather than a simulator program.

In either case, the company notes that with the program plant engineers can estimate pollution concentrations both before and after installation of air pollution control equipment.

Sun said that the program has been effective in calculating pollutant concentrations from 1,000 feet to nearly six miles downwind of a stack. Evaluations have been effectively made up to 1,250 feet on either side of the plume axis, the company added.

The Fortran program has been implemented on a 360/30 in 50K of storage with two disk drives. Sun said that one reason Fortran was chosen as the source language, however, was to permit easy transition to other CPUs.

The plotted output, run off-line, requires two tape units, in addition to the plotter itself.

Government agencies are offered Stack without charge; industrial users can have it under license for $1,000.

Sun Oil's Commercial Development Department is at 1608 Walnut St.

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To Benefit Mankind

Brooks Urges Full DP Utilization

DALLAS – In a speech last week at the Second ACM South Central Region Computer Conference, Rep. Jack Brooks (D-Texas) chided the computer community for failing to promote maximum utilization of computers for benefit of mankind.

At the same time he also stressed the importance of contributions that effective development of data processing techniques may provide.

"It is through the extension of our intellectual capability through the use of computers that we can fully exploit the potential of the future and solve many of the growing problems .... In any area of intellectual endeavor, the computer has a potential application."

Of particular importance, he said, computer techniques must be fully exploited in the struggle against poverty and disease.

"Unfortunately, full exploitation of computers in our efforts to solve these problems and to broaden the development of our society as a whole has been compromised by shortcomings within the nation's computer community.

"Bad computer applications affecting large segments of the people have given computers a bad name in the sight of many people.

He cited the need for society to cope effectively with the computer as well as other trends in modern life that will materially affect the individual's rights to privacy and to personal liberty.

"Sensible and reasonable safeguards against the invasion of the privacy and the rights of the individual must be provided and maintained, and this problem will require our continuing attention during the years to come.

"A second problem affecting full exploitation of computer techniques is the need for increased efficiency in the management of this highly expensive and sophisticated equipment," according to Brooks.

'Hopeless Interface'

A third problem confronting the nation's computer community, said Brooks, is the "almost hopeless interface between computers and those who might use them.

"Despite years of effort to obtain an effective standards program, the ability to use a computer requires the knowledge of a vast complexity of various level languages, conventions, standards, routines and procedures.

"These complexities, many of which are totally unnecessary, are robbing computer technology of much of its potential value to society."

Brooks continued: "With notable exceptions, after 25 years since their introduction, computers, in a meaningful sense, are hardly used in the U.S. or elsewhere in the world. Computer applications ... are applied to routine administrative functions. As important as these rudimentary applications may be, they do not constitute a real challenge to computer technology.

"They do not relate to the fundamental processes of management, to problem simulation, and vast areas of the social sciences that are so vitally important to the future of our society."

Few current installations "give the computer itself a real workout. This fact suggests an approach to computer development that could mean real progress.

"The computer industry should take more of the redundant capacity of our modern, high-speed, high capacity computers and, through software development, provide a more acceptable interface with those who can use computers in thier work," he said.

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Data Communications Users Told of Crisis

By Tom Morton
CW Midwest Bureau

CHICAGO – Communications users attending the annual conference of the Digitronics Users Association (DUA) here last week were told of a crisis in business communications stemming from AT&T's monopoly of long-distance facilities and undue delay by the FCC and others in implementation of the landmark Carterfone Decision (which allows the addition of privately owned equipment to a carrier's lines).

The statements were made by DUA President Clifton W. Sink who pointed out that over a year has passed since the FCC authorized a private phone line and data network connecting six midwestern cities.

He indicated that implementation had been stalled. "Here," he said, "all of us share responsibility." He added: "We should go directly to the FCC and the legislators, bringing the specific inadequacies and lack of progress to their attention and insisting upon action."

William Quirk, AT&T director of data communications, pointed out that one of the major causes of data user's service problems or service disappointments today was "the lack of communications between the user and the telephone company."

Planning Time

He said that while a user may take six months to develop his computer system and programs, he usually, according to Quirk, takes about two weeks with the telephone company in planning his telecommunications needs.

Quirk stressed that the phone company would be able to assist the user to a far more proficient degree if the user gave the company time to plan for him.

John E. Cox, vice-president of Western Union, took issue with AT&T which has been claiming that the growth in data communications was "explosive."

Cox said: "The voice communications growth at 8% per year is greater than the 'explosive' data communications growth."

FCC Commissioner Nicholas Johnson told the conference that AT&T was "robbing" its shareholders "of billions of dollars," and was causing "the public an awful lot of grief, inconvenience, and excess costs."

He also stated that he didn't feel that FCC approval of competition to AT&T would be soon realized.

John D. Goeken, president of MCI, said that it was competition that would force AT&T to give better service to users. He said that now AT&T connects users into existing carrier services, but he predicted that companies that provided customized and point-to-point service such as MCI would force AT&T to provide the same interconnection and at tariffed rates.

The Contest That Wasn't

CAMBRIDGE, Mass. – The contest to find the most effective plan for data destruction [CW, Oct 14] has ended with "few creative ideas," and in fact, few submissions at all, according to one of the sponsors.

Jerry Popek, a Harvard graduate student, indicated that he and cosponsor Mark Tuttle had thought of more "creative" ways of intimidating potential "misusers" of computers, but that their ideas would not be used as contest entries.

He said that both he and Tuttle would continue to be concerned over invasion of privacy and computer billing procedures, in an effort to bring about an end to "public fear of the computer."

He also indicated that a publisher showed an interest in the contest entries, but the paucity of ideas might prevent any release of a "How to Do It" manual.

In a related matter, the issue of public concern was emphasized when a major manufacturer reported being approached by one of the commercial television networks for a contribution on "how you destroy a computer."

A company official declined elaboration and also declined to participate.

DPMA Business Exam Hit for Poor Preparation

(Continued from Page 1)

confusing .... Cobol and Fortran appeared to be neither clearly up-to-date nor conforming to Ansi standard."

Asked about the complaints concerning the first run of the RBPE, MacPherson said that the DPMA certification council "will consider comments on each question" and determine if any questions should be thrown out. The next meeting of the certification council is scheduled for Nov. 19, he said.

Cheating?

Responding to Bealle's contention that those who sat for the exam were permitted to alter answers after discussing the questions during a break, MacPherson said: "I would be most interested in hearing ... if anything can be proved; changing answers was not anticipated, and it is inappropriate. The council will take whatever steps necessary to indicate displeasure [if anything is proved].

Besides criticism of typos, the exam has been faulted for vagueness, lack of rigor, uninstructed proctors, too many questions concerned with Fortran and Algol, no questions on operating systems and debugging theory, and even poor reproduction.

MacPherson said he didn't know exactly when results of the test would be available, but admitted that 10 weeks after administration of the test was possible. This would be about a month after the certification council meeting.

The education director also said that in its history of administering tests, the DPMA "has hit just about every form of comment; in some cases adverse comment has proved to be accurate, in others we have found someone had an axe to grind."

Speaking of complaints about proctors, MacPherson also said that in some cases the DPMA has found that "friction developed between those sitting for the exam and those administering it."

Computer Taxis Proposed

MUNICH – Traffic experts at the Futurologists' Congress in Munich proposed new methods to alleviate chaotic traffic conditions in city centers.

Taxis or buses driven by computers and running on rails could for the most part banish private cars from the center of cities.

Case System Defended

(Continued from Page 1)

for want of prosecution] or nolled [which indicates a prosecutor will proceed no further in a legal action]," said Mrs. Joan E. Jacoby, director of the D.C. Office of Crime Analysis.

"This is the first time," Mrs. Jacoby said, "that a tool has been developed for the prosecutor which integrates (1) the needs and demands placed upon the prosecutor from an operational point of view with (2) statistical methodologies which have been developed from criminological research, and (3) the capabilities of the computer to examine permutations and combinations of conflict which are beyond the resources of the harried and overworked prosecutor."

There are generally four criteria for the establishment of priorities. They are the "bad guys," bad crimes, the age of the case, and the probability of the government's winning.

Each day the system prints a list of all cases scheduled for trial on two weeks from that day. This becomes the prosecutor's priority calendar. If any problems appear on the calendar, the prosecutor assigned to the case has two weeks to try to resolve them.

For example, a problem could involve the possibility of a witness' availability being uncertain or a missing laboratory report.

"The system," said Mrs. Jacoby, "is merely one partial solution to the overall problem of the U.S. Attorney's Office which is essentially a very large staging and scheduling problem. By next June, we hope to have real-time update of the system in operation."

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Mark Reader Helps Bypass Keypunching

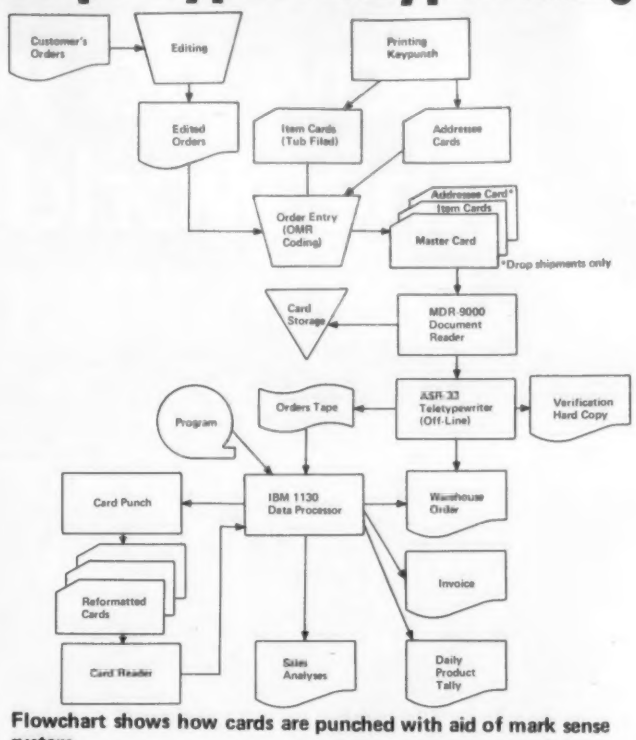
CHICAGO – When Wilton Enterprises, Inc., a manufacturer and distributor of cake decorating supplies, decided to convert to a DP system for order entry, the principle requirement was that it should allow the existing clerical staff to continue to enter orders with a minimum of keypunching.

The new system meets this requirement and also has yielded important benefits in easing inventory control functions. Now, two order-entry clerks process 900-2,000 tab cards a day, 7,000-10,000 a week, with the converted data being processed by an 1130.

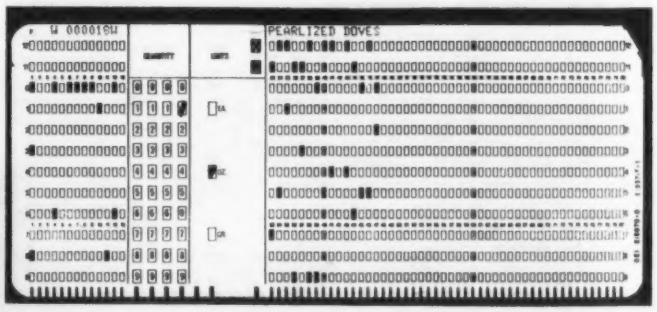
The Wilton system is designed around the use of an optical mark reader, a Motorola MDR-9000 Document Reader, which converts data from marked cards and combination prepunched and marked cards to paper tape, ready for input to the computer.

Also, a hard-copy verification record is printed. The information is then processed by the computer into warehouse orders, invoices, and sales analyses.

Emphasis in the system is on uncomplicated tasks for the order clerks, little keypunching of active data, and automated preparation of fixed data cards. The flowchart illustrates the procedures.



Flowchart shows how cards are punched with aid of mark sense system.



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Computer Given To 'Axe-Handle' Gov. Maddox

ATLANTA – TLW computer industries last week presented an IBM 1620 computer to Gov. Lester Maddox to be given in his name to a Georgia college or university of his choice. The presentation highlighted the official opening of TLW's new headquarters here.

Tom Williams, TLW's president, said: "We are pleased to be able to make this gift in the governor's name to a Georgia school which has real need of a computer for educational and regular business applications."

Maddox remarked that TLW "shows what can happen when people with initiative, talent and determination" build. He contrasted this with what he termed "the hippie industry," which he said "tears down."

TLW's new facility is 15,000 sq ft. The company, which specializes in selling and/or leasing used unit record equipment and computers up to 360/40s is three years old.

"The economic recession," said Williams, "has not affected us materially. In fact, it has helped us. People for the first time are getting the message of how they can save money by buying second-use equipment."

Williams added that IBM's announcement of its 370 family in June is expected to create "greater availability of the 360s."

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Property Descriptions Omitted in County Tax Bills

By Edward J. Bride
CW Staff Writer

LONDON, Ky. – What is being described as a programming error caused a bit of consternation when county tax bills were sent out recently: the legal descriptions of taxed properties were not included on the bills.

As a result, hundreds of property owners received bills for property that was not described, not listed, and not identified in any manner.

Included in the mailing were several taxpayers who own five or more different pieces of real estate and who have a vested interest in knowing the taxes on each parcel.

Officials of one county said that 26 of Kentucky's 120 counties were affected, but the computer service firm performing the mailing said only about four or five were involved.

The actual number of "foul-ups" could not be determined, because all counties do not require this description, and the firm in question, Appalachian Computer Services (ACS), has individual contracts with just over half the state's counties.

ACS President Bob McReynolds said that about 15 counties had received bills when someone noticed the descriptions had been omitted, but "only four or five" counties were affected by the omissions. The others presumably did not require the description.

Explains the Error

ACS Vice-President Donald White explained that, in making program changes to Kentucky's new tax bill, a programmer stored the property descriptions in the "wrong location" in the computer.

McReynolds further noted the program was not changed to reflect the location change so that, when the billing program was run, the property descriptions were not extracted.

White also stated the bills were checked for accuracy of calculations, but the property descriptions are the "least important and most subtle" entries on the bills. As such, their elimination was "overlooked" until persons directly affected received the bills.

White concluded: "We captured all the information, it was keypunched correctly, verified, and audited. It just wasn't picked up in the loading process."

ACS operates a leased IBM 360/20 in its headquarters here, and sends out between 600,000 to 700,000 tax bills as a result of its contracts with 70 individual county clerks. It also performs billings for about 270 physicians, and has related services with other businesses.

McReynolds said the affected counties did not ask for rebates (because of the omissions), although he did admit it was a "stupid mistake on our part."

There's Gold in the Hills

LONDON, Ky. – A service company willing to go to the "poverty belt" for its customers appropriately chose "Appalachian Computer Service" for its title.

The company leases an IBM 360/20, which it runs around the clock, seven days a week, in an effort to get enough customers with enough applications to warrant moving to a 370/155 or 165 in about two years.

ACS President Bob McReynolds said the company performs batch processing for billing and payroll applications for banks, doctors, and for about 70 of Kentucky's 120 counties. Most of these would be good on-line applications, he said.

McReynolds estimated the national time-sharing service Bureau market at around $20 billion, and claimed that $5 billion of that is in rural America.

UCLA's Transim Shows Versatility

LOS ANGELES – Ideas and techniques developed by UCLA researchers get around, but few are applied in as many different places as Transim.

Transim is involved in the economy of Newfoundland, hospital administration, railroad scheduling, port cargo handling, and Navy project management.

Basically, Transim, which stands for Transportation Simulator, is a general-purpose computer program. Its job is to consider the thousands of decision factors that go into the day-by-day operations of complex systems and to come up with an accurate analysis of the cost, time, and operational problems involved.

Sophisticated in concept but simple in application, Transim has been developed and constantly refined over the past six years by Associate Dean R.R. O'Neill and program manager Alfred M. Feiler of the UCLA School of Engineering and Applied Science.

One recent Transim project involved simulating on a computer the step-by-step administrative and service processes at Rancho Los Amigos Hospital for a patient suffering from injuries of the spinal chord – from the accident itself to final discharge.

"This is one of the first simulations of such a complex hospital system," said Feiler. "So far, we have analyzed the initial part of the process, from the accident to hospital admission evaluation, consisting of 215 separate steps."

When the job is completed, the hospital will have a blueprint for the most efficient utilization of its staff and facilities, Feiler believes.

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Study Sees Graphic Arts Moving Into 'High Technology'

CHICAGO – A $100,000 Battelle Memorial Institute forecast underwritten by MGD Graphics Systems has predicted an age when printing as a whole actually will be stimulated, not killed, by electronic media and other new technologies.

But it will also be an age of survival of the fittest, the forecast says. Two out of three companies now in the $10-billion-plus graphic arts industry must make major changes to survive by 1990.

Printing and publishing, or the graphic arts industry in general, is emerging into "high technology," the study says, after centuries when ingenious mechanics and crude chemistry, bordering on alchemy, have served as the industry's technical base for production methods.

Methods introduced in the past decade will apply a broad spectrum of scientific disciplines, including polymer chemistry, optical engineering, elastomer chemistry, information theory and advanced electronics, to tomorrow's printing technology, the study says.

Within 10 years, the need for many skilled production-line craftsmen will be supplanted by mechanized manufacturing controlled or monitored by an operator.

Though the computer is only beginning to show appreciable impact on communications, the study continues, it eventually will become so interrelated with communications as to be considered a communications device.

Catalog and directory publishers will benefit from this technique. Where images have been introduced by microfilming conventional line-printer output, microimages now can be created directly as computer output with an electronic character generator (ECG) or through electronic beam recording.

Electronic character generation (ECG) will print 10% of all computer-produced hard copy by 1975 and 25% by 1980. ECG promises to provide a superior product at lower cost in less time than previous methods. Current controls, programs and software problems will be solved. Electronic typesetting costs will come down.

Computerized composition may never produce all varieties of typesetting, but it is so versatile and economical that it attracts a widening variety of work, the study says. The system can be actuated manually or controlled by computer.

Other technical developments from electronics typesetting are expected to include:

- Automatic making of printing plates.
- Write-edit-design-compose systems that include platemaking control.
- Computer analysis of production requirements, including machine setup.
- Printing with light, electrostatic printing and ink-jet printing.

Plays in Economy Believed Feasible Model of Role Nutrition Computer

COLUMBUS, Ohio – Food problems in developing countries could be dealt with more effectively if decision makers had access to a model of the role nutrition plays in a developing country's economy, implemented on a computer.

The feasibility of such a model, which would eventually show food problems in relation to the total social and economic system, has been studied for the FAO/WHO/Unicef Protein Advisory Group (PAG) by the Columbus Laboratories of Battelle Memorial Institute.

According to Battelle's Dr. Sheldon R. Simon, a model could speed up decision making in this field as well as enhance its effectiveness. Discussing the need for such a tool, he said that one of the major problems experienced by administrators in developing countries is deciding where to put the resources available for developmental efforts.

"To come to grips with the situation you have to look at the total picture – something that could be done with a model which mathematically simulates all major aspects of the economic and social system," Simon noted.

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(see Page 32)

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Need That Check?

GSA Bales Cards for Recycling

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – The federal government which ranks as one of the largest users of computers in the world also ranks near the top in the retention and destruction of DP paper.

A number of federal agencies, such as the Department of Defense and the Tennessee Valley Authority, destroy and/or sell some of their own punched cards and computer printout sheets.

However, the General Services Administration, the federal housekeeping organization, still accepts records, and stores, services and destroys them as appropriate for the bulk of U.S. agencies.

The GSA's National Archives and Records Services (Nars) maintains 14 federal record centers throughout the country where this type of work is done.

Although there is no breakdown for what types of records are kept – such as tab cards, printouts, etc. – Nars had a total of 10.7 million cubic ft of records in the federal records system as of June 30, 1970, with 966,000 cubic ft added last year alone. The agency destroyed 596,500 cubic ft of records in fiscal 1970.

One of Nars' largest records operations is in Mechanicsburg, Pa., where Treasury checks on punched card stock, in particular, are destroyed. Here, the checks, which are normally destroyed after seven years of storage, are shredded, baled and sold via salvage companies to mills for recycling into various types of paper products.

At present, shredded Treasury checks bring up to $85/ton because of their high rag content, according to an official of Nars. Regular punched card stock usually brings up to $75/ton, he added. Computer printout, which presently is not segregated from the mass of paper destroyed, brings about $1 a ton. Separated printout is worth about $20/ton.

Mechanicsburg center bales shredded punched card Treasury checks, which are sold through salvage companies to mills for recycling purposes.

Buried Data Gives Answer

LOS ANGELES – It has long been conventional wisdom that we are in the middle of an information explosion, and that only the computer can save us from suffocating in our own knowledge.

For once conventional wisdom may be right.

A search through the computerized files of the Nasa-sponsored Western Research Application Center (Wesrac) at the University of Southern California has discovered a paper by three Japanese scientists describing a bacteria that removes poisonous mercury compounds from waste water.

Though concern with mercury contamination has been growing only over the last few months, the paper was published two years ago.

The paper turned up when Wesrac searched for all data in its files having anything to do with mercury. Wesrac director Kendell Oulie said that the computer looked through half a million documents.

"It took two hours to run through all the taped references," he noted.

The article on pseudomonas K-62, a mercury-eating bacteria, showed up in the December 1968 issue of "Fermentation Technology," a Japanese language publication.

Wesrac is one of several data depots maintained by Nasa.

A Wesrac chemist, Dr. Bruno Loran, explained that pseudomonas metabolizes the mercury compounds, and then, when placed in a nutrient medium, promptly exhales them in the form of a volatile gas. The gas can then be easily trapped by a carbon filter and rendered innocuous.

Computer Labeled 'Horrifying Tool'

BRUSSELS – At the recent European convention on human rights attended by an international assembly of over 400 attorneys here, the computer was branded as a possible "horrifying tool for prying and repression."

Conference attendees stated that doing something about the problems computers can cause is urgent, but Chief Justice Henri Rolin of the European Court of Human Rights told a news conference any international action would be premature. "We are still feeling our way around," he explained.

The conclusions of the lawyers were summarized in a statement on the rights of man, especially the right to privacy.

Confessions of a disk pack reject

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"Anyway, I thought I had it made when I started my final physical at RCA. They checked my sense of balance. Went over my tracks. Examined the quality of my coating. Gave me the toughest mechanical and electrical tests in the industry.

"Those people don't miss a thing. I didn't even get to the final test, a chance to prove myself on a computer. Seems I had a slight case of the run-outs.

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Editorials

The FBI Missed the Point

FBI Director J. Edgar Hoover apparently refuses to believe that any policeman could be dishonest. This belief has serious implications for the computer community, because it has led the FBI to plan a vast computer data bank without proper privacy safeguards.

In a letter printed below, Director Hoover challenges an article in CW headlined "FBI to Computerize Rap File; No Safeguards Planned." Unfortunately, he appears to have missed the point of the article, and to have been misinformed on at least one point.

The FBI's National Crime Information Center (NCIC) is a computer data bank containing information on 60,000 wanted persons, as well as on stolen property. Hardware and software safeguards have been included to prevent unauthorized persons from changing or erasing files and to provide a partial record of inquiries.

The point of the article, however, was that NCIC has no safeguards to protect personal privacy. For example, no record is kept of the name of a policeman making an inquiry, so it is impossible to trace a leak. So far, this lack of privacy safeguards has been reasonable because anyone currently listed in the NCIC can be arrested on sight, and rapid and easy access is necessary to determine if such persons are dangerous.

The problem comes from the FBI's plan for a gigantic expansion of the NCIC to include sensitive data on people who are not wanted, without any security measures to protect their privacy. The FBI now maintains a manual file of 19 million arrest and conviction records, commonly called rap sheets. Rap sheets contain information on old cases, including arrests which led to acquittal or dismissal. Such information can be extremely damaging to a man who has committed no crime (see second letter below).

No rap sheets are in the NCIC now. However FBI Special Agent Donald R. Roderick reported at ACM '70 that the FBI hoped next summer to begin adding rap sheets to the NCIC computer system.

In the question period following his talk, Roderick reported that no safeguards would be added to protect the privacy of the people listed. Director Hoover states that he has been advised that no such statement was made. However, the ACM transcript of the meeting includes the following:

MR. HANLON: Joe Hanlon, Computerworld. On NCIC, you spoke about extending NCIC to include criminal history files. Two questions. First, is there some sort of time table as to when this will occur, roughly? The second is: The criminal history files are clearly more sensitive than arrest warrants. Are any protections going to be taken to reduce access?

[Roderick answered the first question, discussed plans to make records more complete, and then considered the arguments for and against inclusion of arrests which led to acquittal.]

MR. HANLON: Excuse me, that was not the question. The question was: Will there be any additional restrictions on access, at the terminal, to this information?

MR. RODERICK: The access to the information will be limited, as we see it, to law enforcement agencies in addition to the courts and correction authorities in the criminal justice system.

MR. HANLON: There will be no change in the present procedure?

MR. RODERICK: As we see it now.

MR. HANLON: Thank you.

The problem, as Director Hoover indicates in his letter and Roderick in his statement, is that the FBI believes that privacy is adequately protected because access is limited to duly authorized persons. But even though the majority of police are probably at least as honest as the average citizen, there are sure to be a few dishonest policemen. The fact is stressed by a recent New York grand jury investigation into charges that many policemen have been selling confidential police information to banks, brokerage houses, and other companies who want information on prospective employees.

NCIC makes data available to all policemen, honest and dishonest. No matter how few policemen are dishonest, the computer must be *programmed* to limit access to this data.

At the very least, access to rap sheets should be restricted to a much smaller group of people, perhaps prosecutors, judges, and high police officials. Authorized users should be assigned codes or keys, and the system should be designed to insure a user is who he says he is.

Next, the system must keep a complete record of the name of each user and what he used; that record must be easy to check. Finally, the citizen who believes that his rap sheet has been leaked must have a right to bring a formal complaint, with the assurance that the FBI or some outside agency will investigate.

No computer safeguards can ever totally prevent data theft, but procedures such as these are already in use elsewhere, and they would make it more difficult and more dangerous for the few dishonest policemen.

Toil and Trouble: 1970

Letters to the Editor

FBI's Hoover Criticizes CW's NCIC Coverage

I am writing to protest the publication of an article appearing in the Sept. 30, 1970, issue of Computerworld captioned, "FBI to Computerize Rap File; No Safeguards Planned." This article is not only inaccurate and misleading but, in my opinion, unfairly impugns the professional ethics of law enforcement officers dedicated to preserving law and order in this nation.

The writer of this article is completely unfactual when, in his opening paragraph, he advises the reader that no software or hardware safeguards will be used by the FBI to protect a planned computerized file of criminal histories.

Such safeguards are currently in use in connection with the computerized operations of our National Crime Information Center (NCIC), and it is sheer nonsense for anyone to make an assumption that none will be used in any future applications which might be added to this operational system.

The writer further describes a current NCIC file as containing 60,000 rap sheets on wanted persons. This file is limited to identifying data concerning persons for whom warrants are outstanding and a description of the offense for which these individuals are wanted. No "rap sheets" or criminal history records are presently stored in the NCIC.

An agent of this bureau is quoted as having said that no increased security measures would be introduced in the NCIC system should the computerized criminal history records be added to NCIC files. I have made inquiry concerning this and have been advised no such statement was made.

The article further states that the rapid and widespread dissemination of a person's criminal history record, which record might be incomplete and misleading, can be harmful to any individual. This would imply a complete lack of control as to content and distribution of a record is inherent once it is placed in an FBI computer.

To the contrary, long before such a file becomes operational controls requiring standardization of offense descriptions and other data will be instituted making the computerized record a better record.

Further, the data will not be available to persons other than those duly authorized to receive such information as is the case under current manual procedures.

Finally, I consider the several illustrations denoting misuse of police information by law enforcement officers to be offensive and seemingly designed to place these men in as unfavorable light as possible.

I would appreciate having these comments made known to your reading public. As of possible interest, I enclose one reprint each of four previously published articles which furnish background concerning the NCIC.

J. Edgar Hoover, Director

Federal Bureau of Investigation
Washington, D.C.

See editorial and letter below. Ed.

Reader Volunteers to Testify On Experience With Rap Sheets

Your article "FBI to Computerize Rap File . . . ." was of special interest to me. Rap sheets contain more than merely arrest records. Consider the case of a 15-year-old boy; no previous record; is picked up at high school with others, questioned, fingerprinted, and released without any charge, probation, etc.

The year was 1945, the place was LaGrange, Ill., near Chicago. The incident was connected with locker thefts at the school.

The above individual – who is also the writer – never had another brush with the law except a few minor traffic violations. He subsequently served 10 years in the Air Force, attaining the rank of Master Sergeant and holding a Top Secret clearance. He then completed college under the G.I. Bill and has held a number of positions in data processing, etc.

He never knew the above incident was even in the FBI files until apprised of the record by a "would-be" employer. And now we are contemplating releasing this type of data without safeguards?

We should really be calling "rap" sheets "incident" sheets – many of which involved innocent juveniles and should have been destroyed by court order a long time ago. Many states do not allow juvenile information to leave the state, but frequently the FBI obtains the information anyhow.

I would be happy to testify before any committee concerning this subject.

Name withheld by request.

Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington Street, Newton, Mass. 02160.

Here Are Two Items for the DP Manager's Budget

The Taylor Report
By
Alan Taylor, CDP

Unbundling has seen many changes in the life of a computer installation. A number of firms have started in-house training for the first time, and found that it has paid off. Others have started going outside to find software that can replace or complement the software that they are being provided with – and have sometimes found that this pays off.

Most firms, however, have only come to the point where they feel that something has to be done but they do not quite know what.

This is not very surprising. The situation is completely new and actually affects not merely software but also hardware. In the past, the key item of a computer installation was to get its particular applications on the air.

To do this, the proposal in the red binder or the one in the blue binder was accepted in toto. Having made this selection, the installation went ahead, and, hopefully, after some time was running the inventory control system or whatever the particular application was.

The costs involved in the computer area itself were considered to be comparatively unimportant, compared with the profits available from the application and available from realizing that computers would function properly.

This lack of attention to the dollars involved in the computer room was perfectly justifiable at that time. A strict cost-accounting post-mortum would have been impractical and would have caused a number of unnecessary and basically unrewarding fights.

Situation Has Changed

However, with the emergence of unbundling, of plug-to-plug replacement hardware, and of many operational programs that are offered commercially, the situation has changed. No longer is the decision simply between the proposal in the red binder and the one in the blue binder.

No longer is the choice one that only has to be made every five years. No longer is the money spent in data processing not considered important. Now money has to be handled properly. Consideration has to be given every day to whether economies can be made.

Management Role Increased

This is a new duty added to computer management. It, like any other duty, involves techniques, costs, etc. One way that some people are handling this is to put one or more people into a research team.

These people check the ads in the papers, or go to meetings and hear about various terminals, input/output systems, optimizers, etc. – and then come home, get on the telephone, and may eventually come up with some form of a recommendation to experiment with one item or another.

Unfortunately this way is expensive and can easily cost about $20,000 a year.

Watching Economically

There are cheaper methods of keeping watch. And two of them appear to be particularly appropriate. One has been in existence for some years and is only just really being modified to handle the new situation, while the other was created after IBM unbundled, and was particularly designed for today's situation. Even so, recent months have seen it develop into something more generally useful.

Software Listing

The older of the two is the ICP Quarterly. This is a listing of software programs that is put out every quarter by International Computer Programs, Inc. of Indianapolis. The important point about the list is that it is fairly complete.

New programs are added as soon as found, and enough technical detail of them is given to allow a manager to survey a particular program and decide whether there is a real chance that he will be interested in it.

Emphasis is placed on giving contacts, and the responsibility of deciding that the program is really of interest to a particular installation is passed on to the manager.

This is a practical way of doing things. It allows an installation, in about one day every three months, to survey the field, noting whether there are programs of interest and possible value. If there appears to be, then a few telephone calls to the appropriate people will bring good results.

Finding the Rest

Originally started in 1967, the ICP Quarterly has for some time been aimed more to the very large user rather than to the smaller systems. Modifications have just been introduced which make it much more generally attractive. To start with, there has always been the question, "What if I cannot find the program that I want?"

In response, ICP started a Software Locator Service about six weeks ago which accepts requests for particular types of programs. These are then searched for in the files and by telephone calls to possible suppliers, etc. Currently, with some 60 searches performed, they are showing a 70% success rate, which is not bad at all.

This has an interesting effect because it has been found that the use of this Locator Service is bringing the whole software catalog into considerably easier use.

The research libraries in some of the big auditing firms, for instance, now happily accept requests for possible programs because they know if their own expertise cannot find it in the catalog within a short period – all they have to do is pick up the phone, make the query, and in a day or so they will get the answer back. The locator service is allowing them to give a solid service to their users.

The second ICP Quarterly modification made has been to negotiate a set of agreements with many of the listed software suppliers to give a reduced price ($100 off) to Quarterly subscribers.

A hundred dollars may not sound like much – and that is the subscription price for the ICP Quarterly – but it may be a lot easier to get budget approval for the Quarterly when you can point out that if you get a single package during the next year the chances are you will get your money back.

Technical Analysis

Datapro 70 is the other service. Unlike the ICP Quarterly, Datapro 70 was started after unbundling. It has always been designed for the small and medium as well as the large users.

It differs from ICP Quarterly in many other ways also, and can be regarded as a different – and in my opinion complementary – product.

Datapro 70 is a monthly service put out by Data Pro Research Corp. of Philadelphia, which covers computers, peripherals proprietary software, and suppliers. Instead of simply listing the items (like ICP Quarterly), it examines them, and writes a pretty complete, independent, report.

The importance of this is quite a lot. A list can be adequately prepared by most people. An analysis, by contrast, needs unusually competent people to to prepare it. The strength of Datapro 70 then is in its analysis, and the usefulness of it lies in how many products is has been able to analyze.

The strength of the Datapro 70 analysts is something that I have personal knowledge of, having had the opportunity to work with them on similar types of analysis during the early 1960s. (As a matter of fact I also did do some work for Datapro 70 at the time that it was started. However, for the past six months they have been able to keep up with the analysis load themselves, so I am no longer personally involved.)

Jack Hillegass I know as a rare person, being both a technical and editorial tyrant. His ability to see through poor writing, or poor thinking has been one of the mainstays of his analysis for years and has been a major point in the training of the people working with him.

The other three major people – Fonnie Reagan, Burt Totaro, and David Axner have all got data processing background in their own right, but I think that they will be the first to acknowledge that their major strength as analyst writers comes from the two-sided training that Jack gives them with his demand for both technical and writing strength.

The service itself, then, is anything but a gloss on the published literature. Most of the reports only cover two or three pages, but there is quite a lot that can be said in that space. Datapro 70 is inclined to say it. When necessary, reports, such as on the System/360, may take up 30 pages.

Speed of reporting new systems appears to be excellent – with the 370/145 and the new RCA systems appearing in the October issue, and the Burroughs systems being scheduled for November.

Special Reports Changed

One very interesting section is the Special Reports area. After a more or less standard start (How to get your Money's Worth From Consultants, How to Buy Software Packages, etc.) they started giving a monthly "All About . . ." report which has allowed them to add extra dimensions to the service each month.

So far CRT terminals, modems, minicomputers and OCR are among the items covered – with COM, computer time-sharing services, and small accounting computers on the way in.

Datapro 70 has grown from a thin binder last January until now, in the October issue, there are some 211 reports (19 computer families, 88 peripherals, 60 software packages, and 44 suppliers). The coverage is exactly that which a manager needs who is looking to save dollars by considering what is out there. The price is somewhat larger than for the ICP Quarterly, $230 per annum, but no one should ever claim that you can do a good technical job without spending money.

In conjunction these two services cost less than 10% of a junior computer operator's salary, and yet can immeasurably improve the manager's understanding of what is available, and how good it is. As new items for what might be called a "computer management budget," (that is the money to be spent to see that the computer dollars are being looked after properly) both systems should be included in any computer library.

There are other areas as well where a few dollars spent can improve computer management, and get it back in control of the 1970's environment. These are not the only two items.

The main thing to be noticed here is that there is a need for such a budget and an advantage in spending these dollars. The action needed is to obtain the budget!

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Letters to the Editor

The Number Is...

Your October 7th article on a perfect number is misleading.

Although not specified in the article, the perfect number referred to is $(2^{9940}) * ((2^{9941})-1)$, which has 5,985 decimal digits. That this number is perfect is a consequence of the long-known theorem that if the Mersenne number $M=(2^N)-1$ is prime, then $M*(2^{(N-1)})$ is perfect.

As I recall, it was D.B. Gillies of the University of Illinois who first showed that $(2^{9941})-1$ is prime, using Illiac II about 1962. In addition, he showed that $(2^{11213})-1$ is prime; the corresponding perfect number has 6,752 digits.

If the student referred to in the article independently proved that $(2^{9940}) * ((2^{9941})-1)$ is a perfect number, that is a worthwhile though not original contribution to number theory. If on the other hand, he only evaluated the smaller of Professor Gillies' perfect numbers, that is merely a technical accomplishment.

Walter C. Daugherity

Harvard University

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(see Page 32)

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Data Bank Includes the Ubiquitous Rose

WASHINGTON, D.C. – A rose is more than a rose these days in a computerized project funded by the National Science Foundation and being conducted at the Smithsonian Institution.

Gertrude Stein, who authored the famous line about the rose that is simply that, probably wouldn't recognize what has happened to her flower. For the rose and other plants are being diagnosed, described, and documented in a data bank.

D.C. Data-Line
By
Alan Drattell

Flora North America (FNA) is an international program using computers to organize and communicate information about the plants of North America, according to Mrs. Harriet Meadow of the American Institute of Biological Sciences, who is systems development manager of the project. Stanwyn G. Shetler of the Smithsonian administers the day-to-day activities of the project.

"We're trying to develop a data bank of information," she said "At this point we're in a design phase. By next year, we will have determined what information should be included in the bank and who the prime users of it will be."

15 Years of Inventory

FNA is a long-term effort. The inventory stage, the building of the bank, is expected to take about 15 years. Products such as catalogs of type specimen data and a roster of scientists active in botanical research will be available within the year.

It will be several years at least before the bank is expected to aid botanists and many years may be required before it can serve other biologists and the public in a significant way, according to Mrs. Meadow.

The data bank will contain files of botanical and related biological and environment information; vocabularies and glossaries of standard terms, including taxomic and geographic names, for use by the information system in checking data input and output; and a variety of specialized computer programs for processing and retrieving data.

The bank's data will come from field workers gathering information on the ecology, distribution and biology of plants, populations and species; from herbaria, data on the nomenclature, morphology and geographical range of species; and from books, journals and card files. Other sources will be botanical gardens, experimental laboratories, and other scientific information systems such as biological abstracts and bibliography of agriculture.

Customized Response

Output of the bank will include a several volume study of the vascular plants of North America (north of Mexico), and a primary service of the system will be customized response to information queries or application demands.

The Smithsonian has to date served as the nerve center for gathering and processing data. In the initial phase of the pilot project, data was captured on paper tape and then transferred to mag tape for storing and processing. The collaboration of 50 institutions was invited on a trial basis.

The second phase of the pilot effort, still underway, has involved sending data directly to an IBM 360/40 located at VIP Systems in Washington, D.C., from a 2741 terminal located at the Smithsonian. An on-line text-editing system is being used to automate the data.

The third and final phase of the pilot effort is directed toward producing sample products and services. Once the data is automated and edited the records are added to a master file which can be processed by a generalized information system.

Catalogs, arranged by name of plant, place of collation, etc., can be produced fairly easily and custom queries can be handled, explained Mrs. Meadow.

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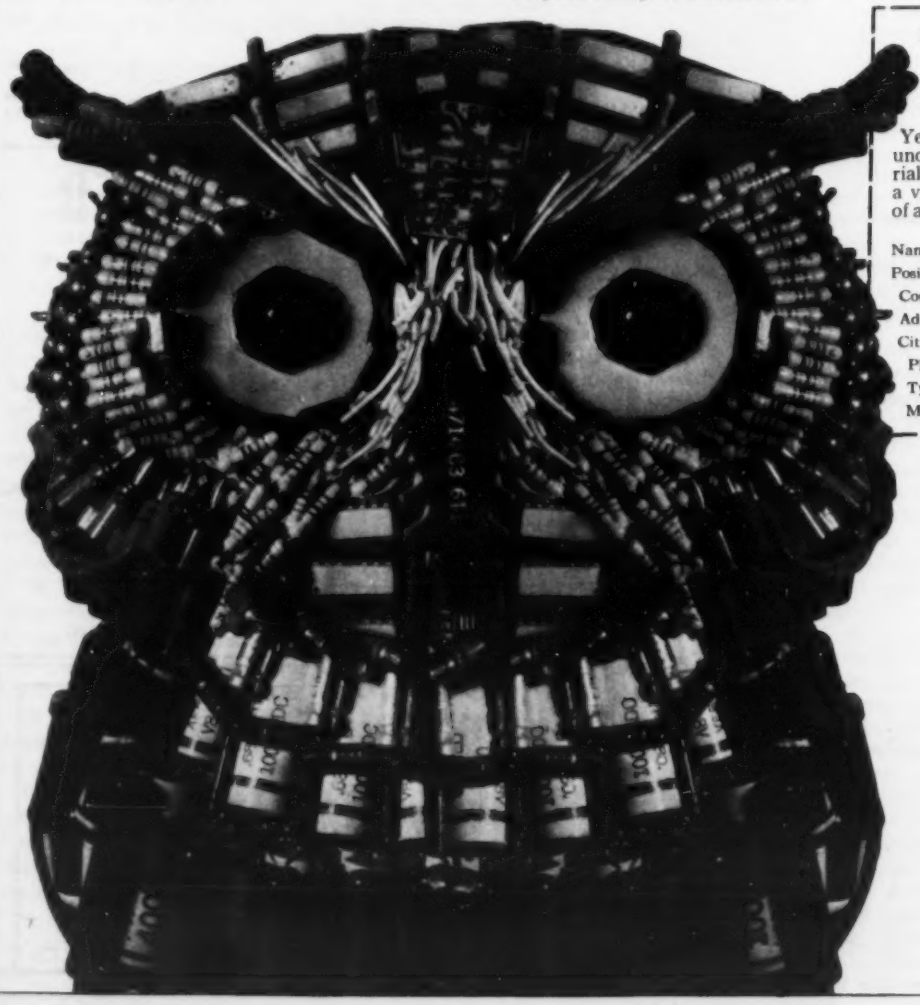

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Progressive Better Business Bureau Uses New Tool

By Edward J. Bride
CW Staff Writer

DENVER – The computer has identified 252 trades with varying consumer dissatisfaction, thanks to a Better Business Bureau (BBB) which is "a little more progressive" in planning for the future.

The Rocky Mountain bureau has leased an IBM 360/20 to compile and analyze the 50,000 consumer "expressions" it receives annually, from requests for information to emergency complaints.

The result has been "so much information that we're having a hard time coping with it all," according to W. Dan Bell, president of the local affiliate.

'Pinpoint Problem Children'

Nonetheless, the output has improved the likelihood of individual businesses correcting causes of complaints, because "now we can pinpoint not only the problems, but also the problem children," Bell stated.

He said interpretation of the data would benefit the BBB's internal operations, the specific problem areas, and the general economic community. He also claimed the project will provide legislators with more accurate and timely information upon which to base new laws.

Various Categories

Bell indicated that the actual cause of complaint was only one way of sorting consumer "expressions." Companies are also categorized by responsiveness, trade group, product, and service offered.

The consumer communication is entered on mark-sense data cards, which are sorted by the various criteria so that the different impacts on business can be discovered. Bell said that the Rocky Mountain BBB is the first in the country to try such a project, and as such, will be a model for the computerization of all 138 bureaus.

He does not anticipate Rocky Mountain's becoming a service bureau operation for these other offices: "We simply are a little more progressive . . . in doing what we know has to be done for the future." He said the project was first recommended by the Stanford Research Institute about three years ago.

The project is somewhat similar to one recently inaugurated by the Consumer Protection Division of the Federal Trade Commission. Bell suggested that the FTC project deals with specific law violations, however, and the BBB system handles the "grey area" of complaints "between violation of law and ethical enterprises." The FTC system uses local enforcement coordinating committees to handle complaints and direct them to proper recipients. An FTC spokesman hailed the system as providing a "one-stop service for a person who wants to file a complaint."

These complaints are also categorized by various criteria, including trade group, product, and service. Duplications are avoided because the computer correlates the initials of the complainant, the company, products etc., and directs the information to the appropriate person.

Bell said the three leading groups in consumer expressions, i.e. those eliciting most complaints, are home improvement companies, automobile service work, and the door-to-door selling of magazines, books, and encyclopedias.

Preliminary federal results indicated that home delivery of goods is a great area for concern. Consumers indicate they often do not receive what they ordered, "or don't receive it at all," the FTC spokesman stated.

The projects are proceeding independently, although Bell said information should be collected in standard form so a national system could be established when these two pilot projects are completed.

Sales Tactics Confuse Potential Users

Computer companies vying for user dollars sometimes resort to "frightening derogation of each other," according to the computer-compiled results of consumer complaints in the Denver area.

The Rocky Mountain Better Business Bureau reported that hardware companies are "very sophisticated and subtle" about mutual criticism, but "they still scare [the user] because the customer becomes uncertain as to who is right and who is wrong."

W. Dan Bell, president of the Rocky Mountain BBB, called on computer companies, most notably service bureaus, to develop "more ethical selling practices," especially when dealing with new customers.

Some service companies "come in with a broad approach that leaves the world open to the customer, who doesn't really understand what he's going to buy, what he's going to have to pay," Bell said.

"The new customers don't know very much about what they're being offered, and they get scared away by the competitive claims."

Int'l Association Of Programmers May Disband Soon

CHICAGO – The fledgling International Association of Computer Programmers has apparently "fledged out of business."

IACP President Lawrence Vanucci stated the five-man board of directors was contemplating disbanding the association, but at least one regional chapter claimed it was told by Vanucci that dues would be refunded because the decision had already been made.

A Year Old

IACP was formed about a year ago, but had little financial backing. More recently, the Association of Computer Programmers and Analysts announced its own plans to become the largest group of its type in this country, and these efforts have somewhat overshadowed the IACP's attempts at growth.

Vanucci said the economy's sluggish pace was stifling any membership incentives, since jobs are uncertain, growth has stopped in many areas, and there is general pessimism about any turnaround.

He said the association has about 600 members, but needs about 2,000 to 3,000 in order to survive.

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L.A. Strives to Update Judicial Procedures

By Phyllis Huggins
CW West Coast Bureau

LOS ANGELES – Amid predictions by experts that the system of justice in this country will collapse within 10 years if something isn't done to modernize the courts and their related agencies, Los Angeles County has launched an 18-month program to develop a modern information and case following system that will computerize into a common data base information needed by all county level criminal justice agencies.

The Regional Justice Information System (Rjis) will store information on a registered offender and follow him through the justice system including parole or probationary steps. Complete and consistent information will be available to all needing it.

Currently it is possible to have a situation where an offender is tried in one court and the fact that he has previously been arraigned before another court is not even known. Information can also be too blunt. If an offender is arrested for assault with a deadly weapon, there is nothing that requires that his records be qualified with the additional information, for example, that the gun was not loaded.

Thomas R. Gross, project manager for the Los Angeles County data processing department, said they have just completed a determination of the network of problems to be taken up in the system's development and the training of all county personnel involved in a common language so that they can work as a team.

Facilitating the team effort is the Justice Data Centers Users Group, which is a cooperative body representing about 20 agencies who need information from the system. The group's purpose is to define just what information each of them needs.

This joint effort will eliminate the redundant data collected and stored by them individually and will allow them access to all pertinent information on each offender as he passes through the justice system.

In addition to the data base, Rjis will also be used to schedule courts on an optimum basis to reduce the time elapsed between arrest and trial.

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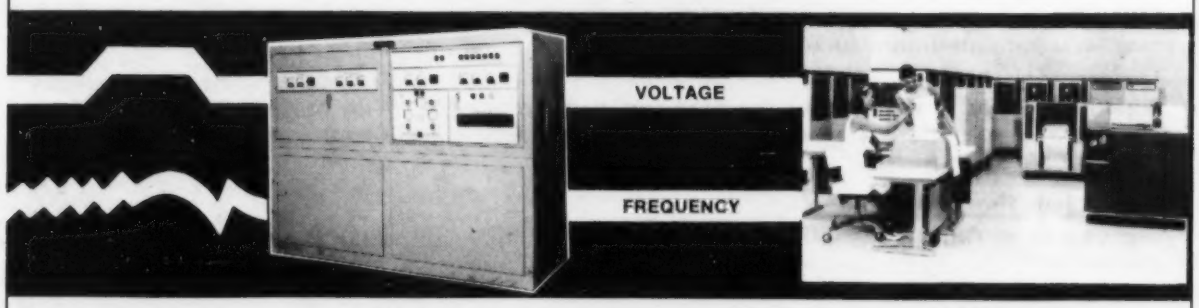

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PSC

Louisiana – Part II

State Is Reaping Benefits

By Edward J. Bride
CW Staff Writer

BATON ROUGE, La. – Improved efficiencies in state agencies and increased controls over present revenue sources are but two of the benefits of Louisiana's round-the-clock computer operation at the State Capitol.

Other benefits of the State Computer Center include better management of state invested funds and new or expanded federal funding for state projects.

Aside from the obvious financial implications, there are also legislative, environmental, and legal applications which help keep computer personnel busy seven days a week.

State officials predict the center will generate millions of dollars through such actions as Louisiana's response to the requirements of the Federal Land and Water Conservation Fund Act.

$3 Million in Recreation Funds

A state can receive funds for use in park and recreation area development, if it can supply a documented plan to be updated annually for the use of these public or leased lands. Louisiana is entitled to nearly $3 million under this act.

The state qualified for the money with the assistance of data produced by the computer center and used in a report detailing plans from 1970 through 1975 on Louisiana's 2-1/2 million acres of outdoor recreation land.

Environmental Research

The state center is also proving useful in fish and game bird research projects carried on by the Louisiana Wildlife and Fisheries Commission.

One such program, the commission's fish sampling project, included analysis of stomach content of various species of fish captured over an eight-year period in various tidal and water chemistry conditions off the Louisiana Gulf Coast.

In addition to supplying the necessary computer processing services, the computer center, through its programmer staff, has provided guidance and training for Wildlife and Fisheries Commission personnel.

This spirit of cooperation also made possible the on-time completion of the commission's 1969-70 Waterfowl, Dove, and Deer Kill report programs. The material gave the state's Wildlife Commission research analysts an accurate management tool on which to make recommendations for the 1970-71 hunting season.

A joint legislative and executive committee supervises all selection, purchasing, and installation of data processing equipment where all or any part of such equipment is to be purchased with state and/or federal funds and used by any state agency.

Parishes and municipalities excluded, all state agencies and divisions come under the committee's supervision in the areas of use and management of DP systems.

Legislative Information

Louisiana lawmakers got a first-hand view of the performance of the computer system during the 1970 session of the legislature. Among other functions, the system provided instant retrieval of title, status, and bill sponsor information for legislation in both houses.

All legislative action is entered into a Univac 494 computer, as it occurs, through "Uniscope" display terminals installed in the House, Senate, Legislative Council's office and the lt. governor's office.

Each morning computer printed report forms are available to lawmakers. These include all bills introduced the previous day, as well as subject index, narrative description of all House and Senate bills, resolutions and concurrent resolutions, a listing of bills introduced by sponsor and prime sponsor, and a current status of House and Senate bills.

Some revenue-producing applications and the state's "in-depth approach to expenditures" will be discussed in the concluding article.

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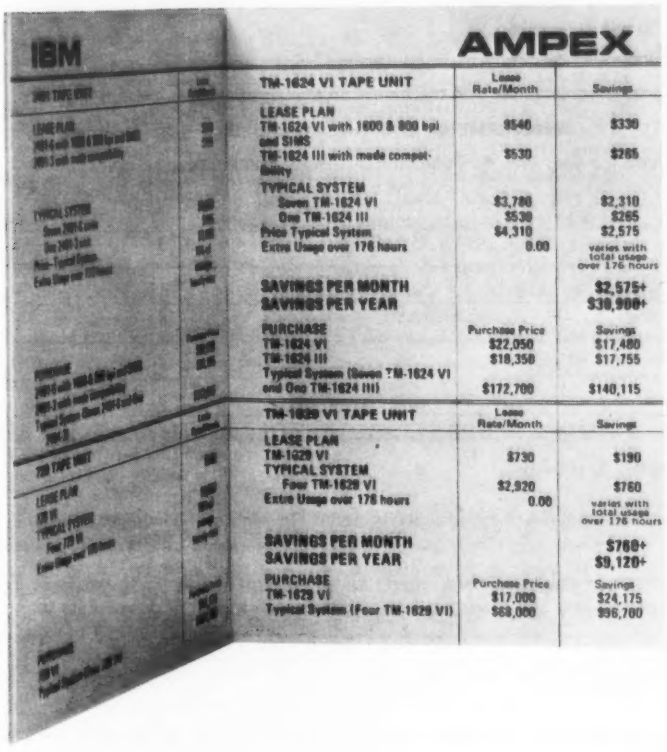

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	Extra Usage over 176 hours	0.00	varies with total usage over 176 hours
	SAVINGS PER MONTH		$2,575+
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	PURCHASE	Purchase Price	Savings
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	TM-1624 III	$18,350	$17,755
	Typical System (Seven TM-1624 VI and One TM-1624 III)	$172,700	$140,115
	TM-1629 VI TAPE UNIT	Lease Rate/Month	Savings
	LEASE PLAN		
	TM-1629 VI	$730	$190
	TYPICAL SYSTEM		
	Four TM-1629 VI	$2,920	$760
	Extra Usage over 176 hours	0.00	varies with total usage over 176 hours
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	SAVINGS PER YEAR		$9,120+
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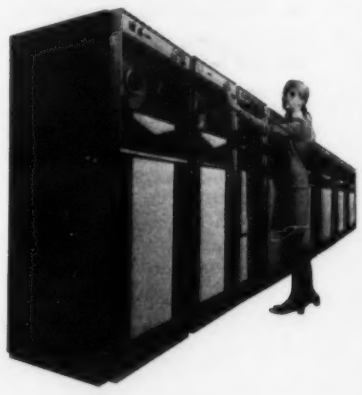

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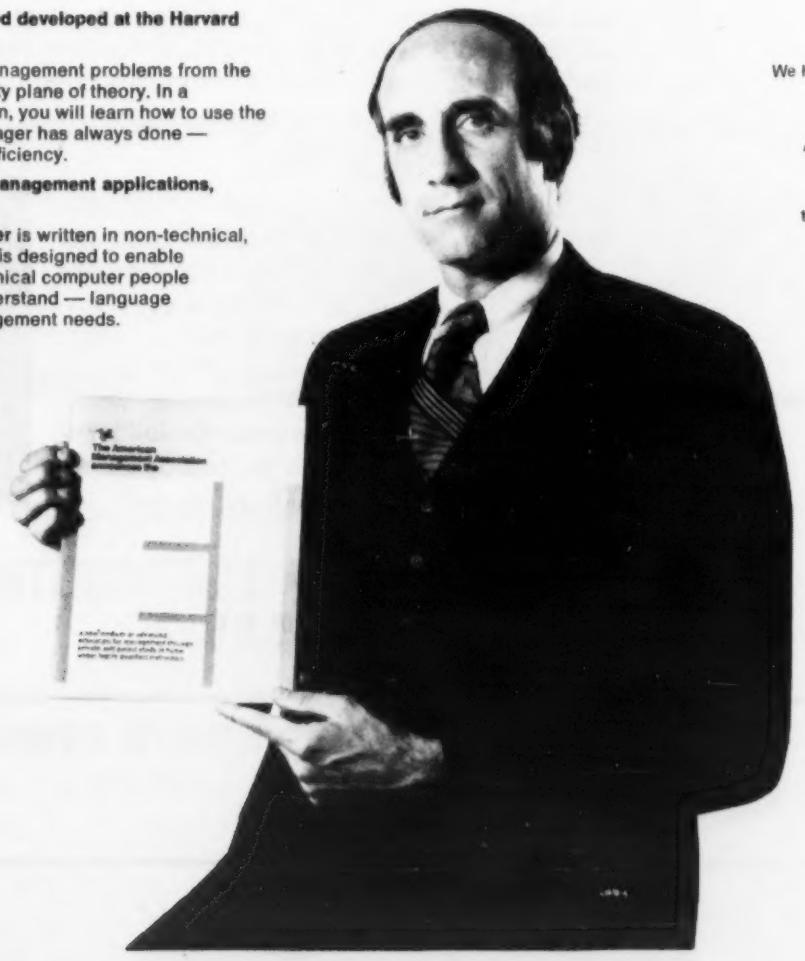

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We have often seen consultants' reports which relate the success of computer utilization to the degree of top management participation in defining the systems requirements.

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Data Capture Genesis Outlined

Despite Competition, Keypunch Still User 'Favorite'

By E. Drake Lundell Jr.
Computer Industry Editor

Today, we're still in the seventh day of the "Genesis" of data capture equipment, and most users are waiting, hoping for the dawn of the eighth with their 029s going full blast under sometimes-hated, sometimes-loved hands of "Katy the keypuncher."

Keypunch *is* the primary means of data capture – an area that is often ignored in the gleaming data processing centers.

But with more and more firms entering the race to replace the ancient keypunch, it is an area that no longer can be ignored; its importance must be realized. And it sometimes is.

For example, during the "great subway strike" in New York City in late 1964, many firms made plans to pick up their upper-echelon executives either by car pool or private limousine service.

That lasted one day for several of the companies.

The second day of the strike, many of the highest paid men in New York were left fending for themselves while the limousines and carpools were diverted to pick up more important employees – the $125/week keypunch operators.

Data capture is more important than the high-level executive, because without it, information-devouring businesses are forced to a halt, and computers sit idle, starved for lack of information.

An Overview

When computers first came into use, they were all card oriented, and were seen more or less as a logical extension of the electronic accounting machines then in use by most large businesses and the federal government.

The first real challenge to punched cards came with the development of the optical character recognition equipment and other optical reading machines such as bar code readers and optical mark readers.

But these machines did not replace the keypunch, primarily due to their great cost and because they required a completely different approach to the idea of data capture.

Most users see the advantages of turning to a device that would completely eliminate the operator from the process of data capture, but, as in the early days of OCR, there are still many applications where the original documents have to be retyped before they can be fed into OCR equipment.

Mohawk Key-to-Tape

The next major development came in 1965 when Mohawk Data Sciences introduced its 1100 key-to-tape series. Univac had tried the idea earlier, but gave up when it appeared the market wasn't ready.

By the time Mohawk began operation, many of the computer systems in use had become tape oriented rather than card oriented. The workload was increasing in most DP installations, justifying increased equipment costs. IBM's 360 series had been announced almost a year earlier.

In addition, the psychological factor must have played a part in the users' acceptance of Mohawk's system.

A DP installation does not have to change its procedures to take advantage of key-to-tape devices – the operation is still usually centralized around a room of young ladies sitting at keyboards.

Key-to-tapes have been improved over the years with the latest versions consisting of several keyboards hooked into a minicomputer (shared processor systems) which offers editing and other capabilities not found on keypunches.

In addition, the Viatron announcement of a keyboard to cassette data entry system provided a huge boost to this market, because for the first time a manufacturer was talking about a data capture system that was actually *cheaper* than the keypunch.

If keypunch price as compared to that of the other systems was the main factor for its continued success, then that barrier has been broken.

Even if Viatron cannot pull off this tremendous gamble, others will. In fact such firms as Data Input Devices and Sycor are already marketing systems that compare favorably with the costs of keypunch operations, although they don't quite match Viatron's price.

However, another development in the computer community also underway that is having profound effects on many users' data capture operations is the upsurge in time-sharing and decentralized DP operations.

Many users are putting teletypes and CRTs at remote locations and accepting input directly from the terminals at the central computer site.

This move, even more so than the move to OCR, calls for changes in the thinking of DP managers – and in most cases a complete reconfiguration of the computer operation.

This trend seems to be growing rapidly, and DP people would be well advised to become familiar with the problems and pitfalls of such operations before too long.

Another area creating a revolution in data capture operations is source data collection – one of the most exciting techniques on the horizon.

This area, which somewhat overlaps the direct input segment, calls for the capture of the data in computer-compatible form at the source of the information, as the name implies.

Imagine every cash register in the world producing computer tape as it rings up a transaction – or even entering the information directly to the computer for processing – without the need for any more paper work. Or a secretary typing a letter, which would be filed automatically in a data bank as it was typed.

The cash registers are here today, and someone is sure to be working on the typewriters.

In the Future

On the horizon there are even more spectacular prospects.

One of these would be direct voice input. An executive could dictate a letter directly to a computer with this technique and the machine would print all the copies he needed. A salesman could make entries to update his accounts from anywhere by phone.

With such a development, the middleman in the data capture operation would be eliminated completely – no need for a secretary to type and file, no need for billing clerks or keypunch operators.

There are many data capture techniques available today and there will be more tomorrow. Users of computer equipment will have to decide which techniques best fit their operations and act on that basis.

For the smaller user, the best, most familiar technique probably is still the keypunch or the stand-alone key-to-tape systems that are in relatively common use today.

For the medium to large computer user with a centralized operation, keypunch and single station key-to-tape units will have to be evaluated against the potentials of OCR equipment and the multistation key-to-tape/disk units now available.

The user who has a highly diversified and decentralized operation will have to evaluate the advantages and disadvantages of any of these centralized modes of operation against the problems and pitfalls that await him in the direct input forest.

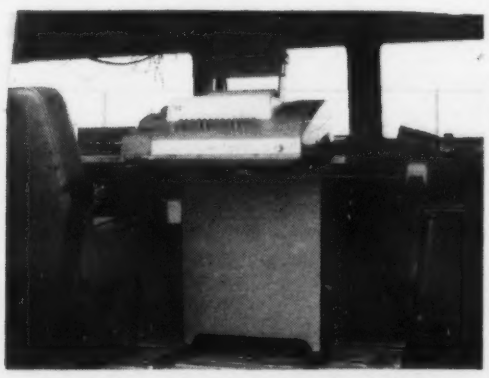
And finally, all users will have to take a look at the new developments that are here or on the way in the area of source data collection.

If ways can be found to eliminate the people who handle data between its source and its final use, much progress will be made in eliminating the "human errors" that plague the "infallible" computers.

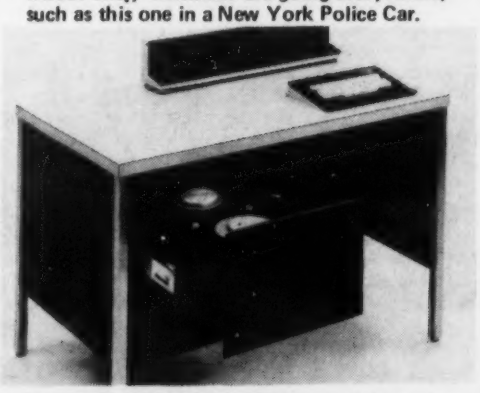
In data capture there's something for everybody today and there will be more tomorrow.

Data Capture in Photos

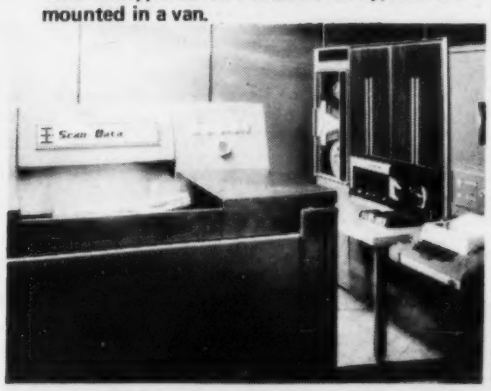
Direct entry terminals are going everywhere, such as this one in a New York Police Car.



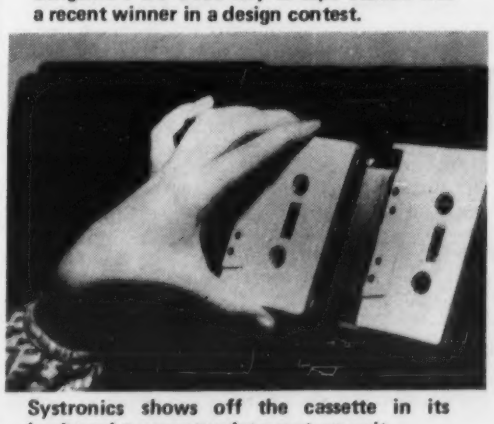
This teletype doesn't look as fancy, but it's mounted in a van.



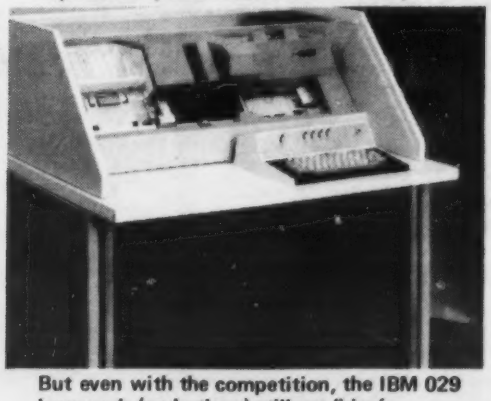
Sangamo's DS 9100 key-to-tape station was a recent winner in a design contest.



This Scan Data Corp. OCR page reader represents optical readers for the lineup.



Systronics shows off the cassette in its keyboard-to-cassette data capture unit.



But even with the competition, the IBM 029 keypunch (and others) still are 'king'.

Trying to Replace Keypunch

More Than Thirty Firms Leap Into Key-to-Tape Sales

The history of key-to-tape devices is short and so far sweet, both to the manufacturers that make the equipment and to users able to take advantage of it.

The real beginning to the industry came with the 1965 introduction of the Mohawk Data Sciences 1100 series data transcriber. The industry has been growing by leaps and bounds ever since, with now more than 30 firms vending their wares to the sometimes overwhelmed user.

Key-to-tape, in all its costumes competes directly with the user's traditional keypunch operation; the decision to switch usually comes down to a matter of cost, which is sometimes hard to determine.

Basically it costs approximately 10% more to rent and operate a key-to-tape system than it does to operate a keypunch, but that cost increase is often counterbalanced by productivity increases of 30% to 40%, according to some users. Other users, however, claim that productivity gains are not that high.

To find out why user reports vary so widely on the productivity increases in key-to-tape over keypunch, Sangamo Electric Co. conducted a user study.

The company found that short records, with a relatively large amount of duplications, reduced recording time the most, while long records with little duplicating reduced it the least.

Sangamo also found that error correction on errors found by the operator was very time-consuming on keypunch equipment, but less so on key-to-tape units.

If the cost is justified on the basis of increased productivity, then the additional benefits found with the key-to-tape machines would also be available, but it is hard to put a value on these extra benefits in the cost comparison of the two types of equipment.

Stand-Alone Systems

There are presently at least 10 manufacturers producing stand-alone key-to-tape units. Besides Mohawk, they include Burroughs (which markets a unit made by Data Trends), Friden, Honeywell, International Data Sciences, Keymatic Data Systems, MAI (unit produced by Digital Information Devices), Potter Instrument, Sangamo, and Vanguard.

All of these companies offer units with codes that cover input requirements of all major computers, 7- or 9-track. They also record into a buffer and offer error correction within a record by backspacing.

These units offer a buffer capacity that is greater than the 80 columns found on a card as an option. In addition, all verify on the same machine used in writing the record.

All of these units offer programming that is similar to a keypunch – Program 1 and Program 2, and left zero is available as an option on all of the units.

The major disadvantage of the stand-alone key-to-tape systems is that all tapes from the individual stations must be pooled onto a single tape by a pooling device before the recorded data is ready for computer entry. The pooler costs extra with the systems.

Non-Computer Grade Tape

Since all of the tapes have to be pooled onto a single computer-compatible tape before they can be used, another group of manufacturers developed single station key-to-tape units that use a non-computer grade tape for the first recording.

Among these are Cybercom, Data Action, IBM, Sycor, Ty-data and Viatron.

The advantages of this type of machine are the elimination of tape handling, smaller size, greater selection in record lengths, and simplified operating procedures. Lower cost is also a factor with the Viatron, Sycor and Ty-Data units.

All of the systems have error correction capabilities similar to the other single station units based on backspacing, and all offer read-after-write check for errors.

The major disadvantage is that if the pooler is down, then data cannot be input to the computer system. The same may be said for a card operation when the card reader is down, however.

Automatic Pooling

The next most sophisticated class of key-to-tape devices includes the systems in which several keyboards are hardwired to one pooler so that the data is automatically pooled as it is recorded by the keyboard operator.

The major advantage of this type of system is immediately obvious; by sharing electronics and recorders among several keyboards, costs can be reduced – generally by over 20%.

Present manufacturers of automatic pooling key-to-tape devices include Addressograph (manufactured by Computer Entry Systems), Friden, Mohawk, Sanders Associates and TEC. Friden and Mohawk also offer stand-alone systems.

Most of these systems offer a CRT as either a standard or operational feature, and the Addressograph system permits the user to keep the data separate for each operator until it is verified, when it is then pooled with the others.

The major problem with automatic systems is that when the pooler breaks down, the whole system is down – with eight to 64 operators idled by equipment failure.

Keyboard-to-Computer

The final major category of key-to-tape devices is the group that incorporates a minicomputer between the keyboarding operation and the tape or disk recording.

The ten major competitors in this category include Computer Machinery Corp., Consolidated Computer Services Ltd., Cybernetics International, Entrex, General Computer Systems, Honeywell, Inforex, Logic Corp., Penta Computer Associates, and Systems Engineering Laboratories.

These systems all cost more than other members of the key-to-tape family, but the minicomputer comes with the system and offers advantages that are not possible on any of the equipment in use.

With the units, all keyed data is recorded onto a disk or drum so that it can be recalled for verification – either by the same operator or a different one, since keying and verifying can be done simultaneously.

To aid in reducing verification, the units offer logic to check data recording, compute balance totals, crosscheck and count records, and other controls.

Break-Even Point

Generally a user can break even with this shared processor approach if he is replacing 14 to 16 stations, with the value of the reduced verification, reduced computer time for editing, and faster throughput as the big area for additional savings.

The major problem is the same as with the other advanced key-to-tape devices – if the central processor goes down, the operators can't work. If a 64 station unit were down for one hour it would be equivalent to 8 girl-days lost. Just the same as if an operator had been on vacation for 8 days.

The key-to-tape field has come a long way from the early days when Mohawk stood alone behind the concept. Manufacturers are entering the field almost daily – and some are dropping out almost as fast.

If a user wants to go the key-to-tape route, he should remember that each step up the ladder (except for the Viatron-like devices) gets progressively more expensive.

Key-to-Cassette Units Offer Low Price, Performance

By Joseph N. Barrett
Special to Computerworld

It would be incorrect to conclude that the small data recorder offering keyboard, tape cassette or cartridge, and display is simply another candidate to replace the keypunch.

Not that many people haven't made the same mistake. Without really examining the situation, it's easy to conclude that the miniterminal faces a highly competitive struggle with stand-alone and cluster key-to-tape terminals, interactive terminals, and optical character terminals.

Casual observers note that key-to-tape units, having been around for several years and having replaced only 13% of the installed keypunches, have not been overwhelmingly successful.

And many wonder what can have possessed so many manufacturers to develop the smaller terminals.

Different Assumptions

The reason is that the manufacturer's view of the future data capture world differs entirely because it rests on different assumptions.

Their basic assumption is that the smaller terminal is something entirely different in concept and potential from the Sanders or Honeywell type of equipment.

One parallel to what may happen in data capture is what actually happened when manufacturers of the smaller, fingertip computers appeared on the market.

It was logical that the mini would sooner or later cut into the sales of larger, traditional central processing systems. Instead, the minis primarily made it possible for an entirely different and larger class of users to afford computers for new applications.

Relate that experience to the way data has been prepared for computers in traditional commercial applications. A clerk writes or types data, either in an expressed or implied format, and the document is transferred to a centralized department for a "keypunching" conversion to card or tape.

One might expect the smaller terminals, if they are faster, less expensive or somehow better than conventional keypunching equipment, to eventually cut into keypunch sales. The case can be made that they are better, just as the key-to-tape cluster machines can be shown to be superior to keypunches.

But it isn't simple technological progress that is at work here. There are basic differences in concept about what data capture is and can become.

Look at the assumption by the keypunch device builder that a highly trained operator can be supplied.

Look at the extensive display and operator instruction provisions on the smaller units, or their standard typewriter keyboards.

Several manufacturers assumed that anyone who can hunt and peck should be able to prepare data for the computer. Or that anyone who now supervises clerk typists should be able to supervise them just as easily if they should begin preparing computer input.

They are evading one real problem facing anyone who tries to replace the trained keypunch operator's machine. "What can you do for me?" she'll ask the potential replacement, and the answer will be that it will let her skills atrophy.

The manufacturer sees his small terminal as not just better than the keypunch but basically different, as were the small, inexpensive, accessible computers.

Not better or different in a narrow, dollars-and-cents way but in a more flexible, more adaptable, more-open-ended way.

Firms such as Digital Equipment Corp. (DEC) took the computer out of the antiseptic display case and put it on the sometimes cluttered benches of scientists and engineers who could do exciting new things with it.

The more expensive keypunch replacements will probably not stimulate this sort of exploration. Or the optical character readers, either. They are meant to be used in antiseptic, closed environments for dedicated, highly utilized applications where they will produce more of the same basic contribution the keypunch has made.

The small unit, on the other hand, costs little to rent, stands up to hard usage, and goes anywhere there's a wall plug. Some even have battery packs. And they're people-compatible. They won't frighten even a shipping dock foreman.

This factor of people compatibility is the key to the change the smaller units can make. Not in the center of a DP operation where the numbers are shuffled, but out on the fringes of the company where the data originates.

The miniterminal promises the beginning of a system approach to data capture, not an improved method for data input.

Barrett is vice-president of Data Input Devices, Inc.

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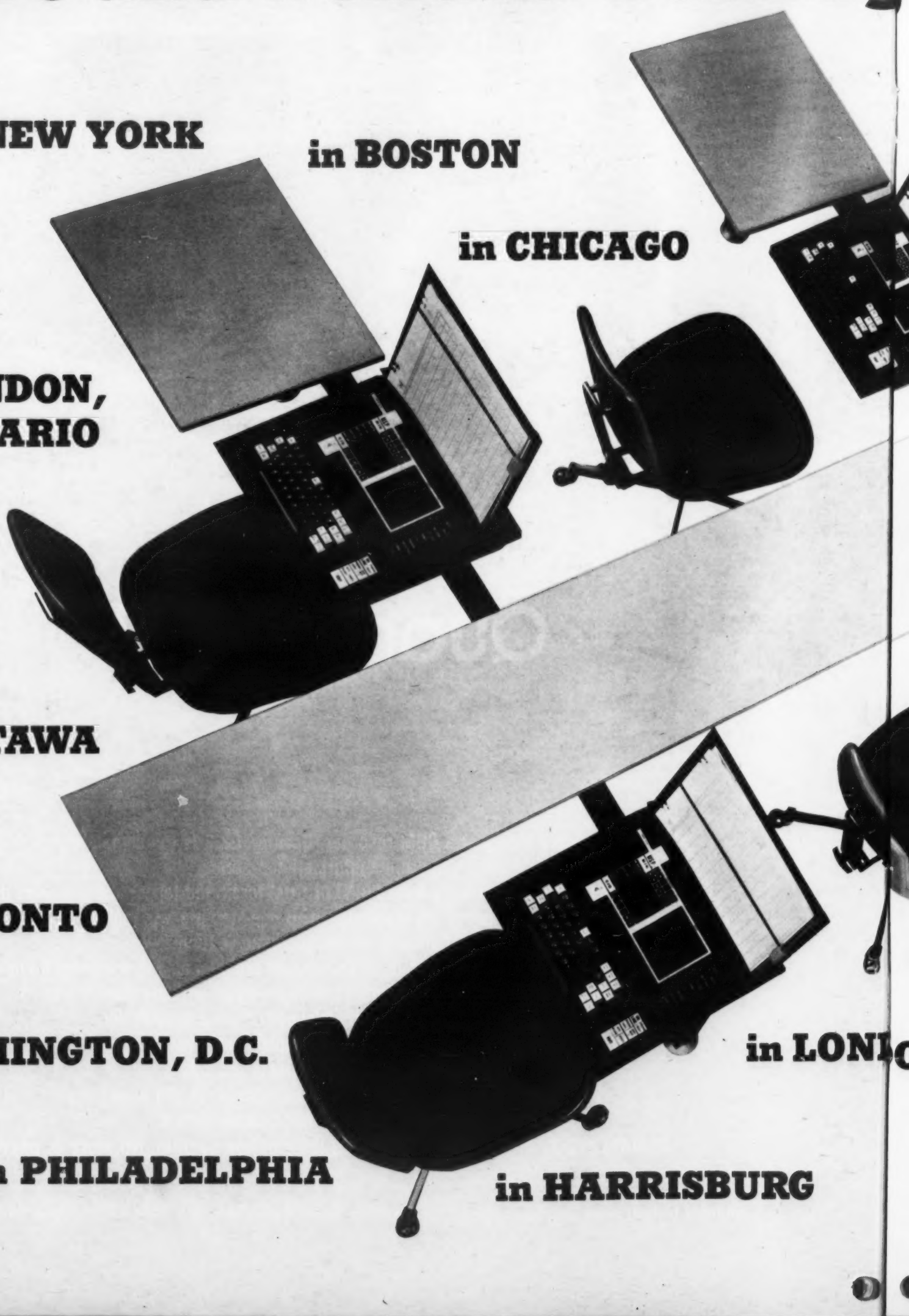

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KEY-EDIT reduces data preparation problems to an absolute minimum.

Proponent Claims OCR Competes Favorably on Price Performance

By Is Sheinberg
Special to Computerworld

Optical character recognition (OCR) is the optimum means of data capture for most computer users because it reads information for computer input directly – exactly the way it is recorded at the data origination point.

OCR takes documents that exist and processes them for computer use as they are, without changing the data into a form that would be unsuitable for humans to read.

This technique obviously saves money, because it makes unnecessary an intermediate transcription of data, which eliminates an additional chance for human errors to creep into the data.

Many misconceptions exist about OCR among potential users and the data processing world in general – namely, that it is too expensive for most data processing systems and users.

When OCR is compared to traditional means of data capture, such as keypunching, its performance is quite favorable. Keypunching and verifying now cost users about $3.5 billion annually, of which $3 billion is for personnel costs. In many instances, the cost of computer input far exceeds the cost of the computers themselves.

For example, 12 experienced keypunch operators working regular eight-hour days produce about 500 hours of work in a week, or 168,000 cards, assuming that there are 40 characters per card and no verification. Total cost for this, including salaries, equipment, and materials would be more than $4,000/week. An OCR system for example can do that same work in one hour, and its basic cost for a week is $3,000.

Key-to-tape and key-to-disk devices are very often direct unit-for-unit replacements for keypunch equipment. As such, they are subject to many of the same economic and operational restrictions. These include operator training, the chance for human errors, and the direct linear increase in costs with an increase in volume.

A major airline installed OCR systems some years ago to perform one task – reading of airline tickets for revenue accounting. It saved $25,000/mo in that function alone. Now, however, the same equipment is used for 15 other tasks.

An example of direct cost displacement by OCR is the oil company credit card organization. A monthly invoice volume of six million tickets required 18 to 20 keypunch machines, six or more scanners, four proofing machines, six or seven sorters, up to five collators, and a few accounting machines – representing a total monthly rental figure of over $20,000.

As for personnel, there probably were as many as 20 keypunch operators, six scanner operators, 20 or more unit record operators, three prebalance clerks, and 15 batch checkers – costing more than $45,000 in 1968 monthly salaries. The handling of rejected documents alone would have tied up about a fifth of the total equipment and personnel.

Comparing the total $65,000/mo figure to the monthly rental and operating costs of the OCR system the company installed, there is a monthly savings of about $20,000.

Besides the costs savings factor, many users could not accomplish complete automation until they installed OCR.

Spiegel, a Chicago-based mail order organization, has used an OCR system since 1967 to process transactions to its accounts receivable file. This involves more than two million names. Spiegel's success with this project led to its eventual use of OCR in a variety of other applications, including maintenance of a sales solicitation file, customer file updating, and a check reconciliation project.

OCR has proved itself economically, according to Spiegel's DP manager, and without it Spiegel could not have feasibly automated its monthly accounts receivable files. In fact, Speigel did not even consider complete automation until the company decided it was practical to use optical reading.

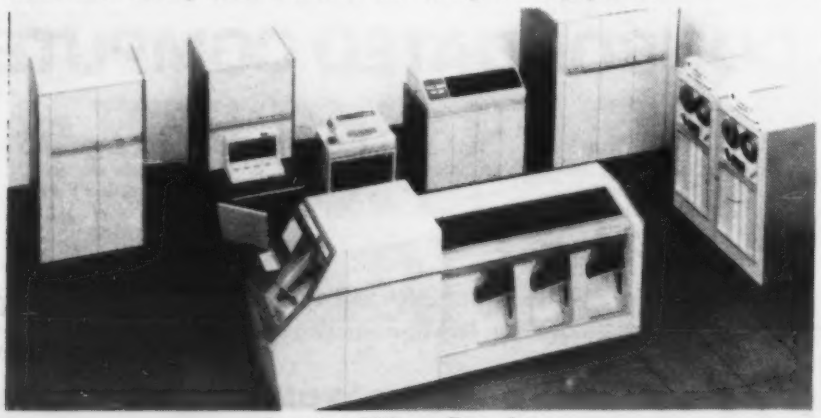
One of the other indirect economic benefits of using OCR, rather than other means of data entry, is the controlling computer that is part of most OCR systems. It saves valuable computer mainframe time by editing and formatting the data before it is recorded onto magneitc tape, thus giving the mainframe accurate data that is already in good form for down-line processing. The OCR system's computer also performs other jobs such as account balancing for check reconciliation.

OCR is also the fastest way of preparing data, and this capability most nearly brings the rate of input processing to the point of keeping up with the speed of very large computer systems. It is not truly meaningful to analyze its value of this information input rate on character reading speed. The economic value of the input system is the effective speed of document turnaround time.

Most companies experience an uneven distribution of workload. The use of an OCR system allows these workloads to be evened out within required timeframes. These could be either daily or seasonal and also could apply to peak periods within the day or season.

Even if OCR is not used for direct reading of source information, users benefit by saving time and money by typing information from the source document for immediate optical reading. The data is still also readable by men as it moves through the information system.

Sheinberg is senior vice-president of Recognition Equipment Inc.



A typical OCR configuration

Often OCR equipment and multistation key-to-tape units are used in relatively high volume application areas, and as such compete for the user's attention – and dollars.

On this page, proponents of the two technologies have been asked to describe the strong points of their technology as compared with other data capturing methods.

These columns should give users some ideas of the strong points of the two different concepts, but are by no means inclusive.

A typical multistation input system.

Multistation Key-Tape Systems Now Out of Pioneering Phases

By Jeffrey M. Donahue
Special to Computerworld

A few months ago a well-known EDP consultant visited a large key-to-tape user in Washington, D.C.

"How does it feel to be a pioneer?" the consultant asked the operations manager about his decision to use shared processor data preparation systems.

"Frankly, being a pioneer didn't entail the risk I expected," the answer came back. "First, because the conversion was simple. And second, because the performance to data has greatly exceeded our expectations and promises tremendous potential for tomorrow."

For those simple reasons, in fact, the shared processor business is out of the pioneering stage and on itw way to becoming the most exciting of the new computer end-user markets of the 1970s.

Shared processing is the data preparation technique that replaces traditional keypunching by linking multiple keyboards to a single small central processor that stores data for subsequent output to magentic tape or disk media.

In the past year, hundreds of shared processor systems have been installed around the world, valued at approximately $25 million. Within the next two years, annual shipments are expected to grow to over $200 million.

The new technology enjoys very substantial performance increases over conventional keypunching. Unlike most new approaches, however, the claims for shared processing are not only justified but demonstrable almost immediately. Many users, for example, experience throughput improvements of 25% to 50% within thirty days after installing a system, depending on the application.

In addition, better control, lower operator turnover rates, powerful editing capabilities, and better utilization of mainframe hardware are some benefits of the shared processing which are realized by the user very quickly. Obviously, the result is lower cost and a better systems approach.

But I have no doubt that the basic reasons for the early success of the shared processor – and the reasons why its long-term role in EDP installations is assured – are its outstanding reliability, ease of conversion and the step-by-step growth possibilities.

This reliability and efficiency make the transition to shared processing the "simple conversion" referred to by the Washington user.

Consider these features:

- Hardware components, for example, are extremely reliable. Shared systems are averaging over 98% uptime from the very start of installation.
- Systems and procedural changes to move from keypunching to basic shared processor data entry are virtually nil. Systems that are fully productive within five working days after installation are common.
- Training requirements are minimal. Although vendors vary in their training support, keypunch supervisors and operators quickly learn the new keyboards, which are generally the same format as the IBM 029.
- Operator acceptance of shared processing systems is surprisingly high, even though the equipment is relatively sophisticated. In my experience introducing other forms of data preparation equipment, operator attitudes always loomed as a potentially severe problem. Shared processing has been a refreshingly happy experience due to its lack of radical systems and procedural changes.
- Attractive leasing plans are available from most vendors, making the move to shared processing convenient and low-cost.
- Site preparation is simple. An area with conventional 110 V current outlets is all that is required for many of the shared processors being marketed today. Also, special air conditioning is not required. Floor space savings of as much as 50% over keypunch can be realized.

These features have been proven at user sites as the success factors that are attracting more and more users to shared processing.

The ultimate utilization that may be obtained from the shared processing approach has a range of potential capability that, as far as I am concerned, will make it the most flexible of all data processing systems.

In the initial usage period, the user gets the system into operation, validates its performance, and plans for the next stages.

In the next stage he can add more powerful editing features and more keyboards – further increasing the cost effectiveness of his system or systems.

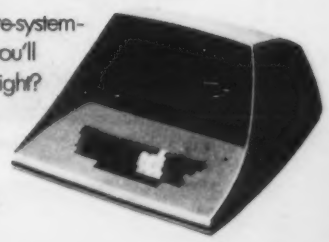
Finally, if he desires, he can do sophisticated editing through customized software. He can start using his central processor for batch processing activities in off-shift hours. He can link peripheral devices to it, such as low-cost line printers, card readers, and remote terminals.

He can do these things, moreover, in very small increments, or in giant steps, as he wishes. He can set his own pace, based upon in-house job priorities and levels of capability.

Donahue is executive vice-president of Consolidated Computer International, Inc.

Our new data entry system is so simple to operate you can hire the operator on looks alone.

Simplicity is what the ENTREX™ System 480 is all about. We build in a comprehensive visual display because the operator who sees what she is recording, prepares data faster and more accurately. Simplicity is a good idea (foolproof is a nice word for it), and we've made it into a good system. With its own computer and disk, the System 480 controls up to 64 individual DATA/SCOPE™ CRT keystations. You can train a girl to run it in a couple of hours. If she can type, she can enter data on the 480. Verifying on the DATA/SCOPE's 480 character display is about as difficult as watching T.V. And if she still manages to get into a jam, our exclusive "Help!" button gets her out. Now there's no reason anyone can't find happiness in data preparation. Especially you: your computer gets a magnetic tape containing 100% accurate data, fully edited and formatted. No re-systemization is necessary. But you'll believe it when you see it, right? Then write: ENTREX, INC., 113 Hartwell Avenue, Lexington, Mass. 02173. Or phone (617) 862-7230.



Cash Now Data Registers?

Cash Register Competitors Capture Data at Source

By Michael Merritt
CW Staff Writer

For a long time computer experts have been eyeing cash registers – with curiosity as well as concern for cash.

For a cash register is basically a device for information acquisition and processing, and that's what computer experts are supposed to be expert at.

And the long years of speculation about computerized cash registers even produced a new, computerized name for the old machine – the point-of-sale terminal.

In the last two years, though, speculation has turned into results, and there are now several companies ready, even eager, to trash the old-fashioned, bell-clanging, nickel-plated cash register and supply in its place a gleaming product of twentieth century technology, a beeping, flashing, point-of-sale terminal.

Pros and Cons

Not that this is entirely bad. A harried retailer, confronted with inexperienced sales clerks, ballooning credit problems, and an inventory problem worthy of the Quartermaster's Corps needs a little help from his friendly computer.

The advantages:

The electronic register is easier to use. The flashing lights tell the sales clerk exactly which buttons to push for any of a myriad of transactions – cash, credit, layaway, return, and so on. This means less time and cost in training clerks.

The electronic register is faster. Less clerk time at the register means more clerk time with customers.

The electronic register can provide instant credit checks, reducing bad receivables.

The electronic register provides quicker billing, thus reducing float.

The electronic register enables much faster and more accurate inventory control.

All this has a price, though. And that price is very simply price. Even in a large store with an extant EDP department, the change from old cash registers to point-of-sale terminals means an extra cost of several hundred thousand dollars.

The Competition

The first off the starting line was Ricca Data Systems back in 1968. The Ricca system uses a Raytheon mini for computing power for its terminals.

Singer Corp.'s Friden Division entered the race in October 1969, when it announced the MDTS as the first of its monthly new products.

Currently Singer is concentrating on installing the MDTS in its Singer sewing centers, which points up the fact that the MDTS – unlike several of the other systems – can be used economically in stores with only one or two terminals, losing, however, the on-line credit check capability.

The Singer stores are part of a chain, however, pointing up the fact that all the terminal systems are designed, in one way or another, for volume use. The candy store on the corner is going to have to stick with the old register.

In the meantime both IBM and General Electric explored the electronic cash register market and backed off. GE, in cooperation with J.C. Penney, spent a rumored $10 million developing the Tradar system before Penney discovered that an on-line only system meant disaster if the central processor ever went down.

Retailers as a rule don't like the idea of having to tell customers to come back tomorrow when the cash registers are working.

Captain Cash Register

The block-buster came last month when NCR announced its 280 point-of-sale terminal system. NCR is to cash registers as IBM is to computers – Big Daddy.

NCR's army of department store register salesmen now have a product to compete with Singer and Ricca, and particularly with American Regitel, which has been showing signs of poaching on NCR's preserve.

The company recently put on-line one system at a major Los Angeles department store early this month.

In addition, Olivetti-Underwood will begin delivery of its system this month, and Pitney-Bowes-Alpex, a joint venture of the postage-meter Pitney-Bowes and Alpex Computer Corp., begins implementation of its Spice system at a New York department store this month.

The market is beginning to take shape, and the options available to a retailer are becoming clearer. American Regitel reports, for example, the possibility of selling its system to service bureaus, which in turn will be able to supply them to small users.

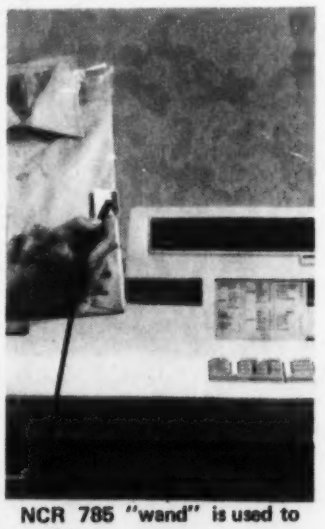
Another alternative is Varifab's 702 data recorder, which doesn't have a cash drawer, but can serve as a data collector for credit sales or order entry.

The $3,000 unit doesn't offer most of the capabilities of the larger systems, but may be of interest to a retailer who already has an EDP facility.

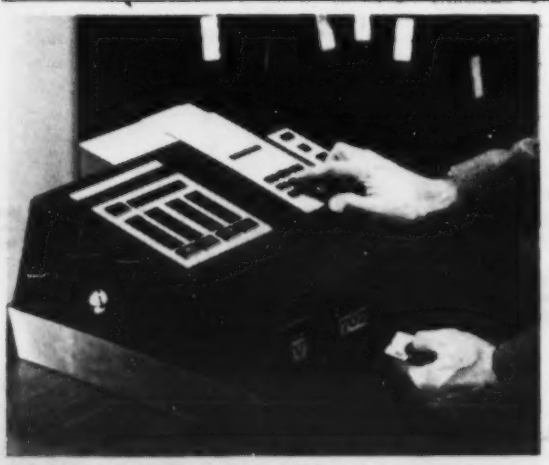
The accompanying chart compares the features of several of the major point-of-sale terminal systems. It is difficult to compare costs directly in a simple chart, so representative prices are given. They do not include options such as NCR's fiber optic tag reader.

Major Units Analyzed

System / Features	Ricca Data Systems	American Regitel	NCR 280	Singer-Friden MDTS	Pitney-Bowes-Alpex Spice System	Varifab 720	Olivetti-Underwood
Type	Local mini	Local mini	Data collector, hardwired terminal	Hardwired terminal, communications	Dual local minis	Data recorder	Local mini (can be dualled)
Stand-Alone Capability	Yes	Yes, some loss	Yes, manual re-entry	Yes	Yes, some loss	No	Yes, some loss
On-Line Credit Check and Inventory Options	Yes	Yes	Yes	Small systems—no Large systems—yes	Yes	No	Yes
Tag Reader Option	Yes	Yes	Yes	Yes	Yes	No	Yes (built-in)
Card Reader Option	Yes (built-in)	Yes	Yes	Yes	No	No	Yes
Totals by Dept. and Class	Yes	Yes	Yes (2)	Yes	Yes	No	Yes
Product Status	Installed	Installed	Deliveries Mid 71	Installed	Implementation	Installed	Installed in Europe, 1st U.S. deliveries 10/70
Cost	Terminal $4,000; computer $50,000 to $70,000	100-terminal system $139,000/yr	144-register system with transmission capability $585,980	One terminal installation with communications $3,650; 100-terminal installation $282,500	144-register system about $430,000	Terminal $3,000	100-terminal system $318,000



NCR 785 "wand" is used to read tag.



Varifab's 702 mini handles off-line data collection in retail outlets.

Singer's MDTS acts as a fully functional, free-standing register.

Ricca terminal reads charge card; computer checks the account.

Eyeing the Girls in the Office

In-House Training Can Increase Operator Efficiency

By E. Drake Lundell Jr.
Computer Industry Editor

When users talk of upgrading their data capture operations, they usually talk in terms of new, faster equipment and overlook one of the main components in most present data capture systems – the often joked about, much maligned keyboard operator.

Whether the user has the ancient keypunch or the newer key-to-tape equipment, he still has the operator standing between the source of the data and its recording. Even if he has an OCR device, often he is faced with the problem of retyping the source documents – and the operator, in this case a typist.

Whether he likes it or not, she is there. And she is often thought of in the same terms as mothers-in-law, a necessity that must be at least tolerated if not liked.

But imagine what would happen if a user could increase the operator's speed by almost 50% – and at the same time reduce errors! Two operators could do the work that three do now; overtime could be cut; costs would come down; he might even get a raise due to the increased efficiency of the DP operation!

Keyboard Training Inc. (KTI) in New York City, claims that, contrary to doubts of managers, keypunch operators may be effectively retrained. A Navy Department study supports the firm's claims.

KTI presently does about 90% of its business retraining "experienced" but actually "mediocre" keyboard operators, and assures an improvement ratio of 20% or more in speed/production/accuracy.

The firm claims that most equipment makers and others offering courses for keypunch operators concentrate their training on how the machines are used and not on operating procedures, so that some girls are more or less self-taught, and others have learned from other personnel that were never properly trained.

Under the program, the firm offers a free appraisal and evaluation of the keyboarding levels for prospective customers in terms of competence, efficiency, accuracy, production, and speed. The firm then recommends which operators could benefit from retraining.

The actual training courses for upgrading the operators last one week for alpha or numerics; or two weeks for training in both alpha and numerics.

Following the courses, the firm gives the customer an overall analysis report of results.

All of the training is normally conducted in-house so that the operators will be trained using the same work flow that they will be using after the courses. The firm will also conduct training courses at its training centers for a slightly higher fee.

Does the program work?

According to a study conducted by the Navy Finance Center in Washington, D.C., it does.

During the study, seven operators were trained by KTI and three were trained by IBM for comparison. In addition, other operators at the center were monitored for comparative purposes.

The center found that the average percentage increase in keystrokes per hour for all operators trained by KTI during the training period was 43%.

In addition, the 13 weeks following the training period reflected an increase in key-stroke productivity from a low of 15.4% to a high of 85.8% (average for all trainees).

"The training given by IBM did not appear to have any effect on the operators trained," however, the center said.

For other clients, the firm has reported cost savings of over $144,000/yr in wages alone, after the firm trained approximately 136 operators for a total cost of $13,600.

Another customer reported an 83% decrease in error ratios on alpha keyboards, with a 20% increase in speed.

Two to Three Weeks

In training inexperienced operators, the firm claims that it can turn out keypunch operators from scratch in only two to three weeks time and "that's in nine to 10 weeks less time than usual."

The system could also be used to train hard-core unemployed personnel, the firm claims, but that would take longer – approximately six weeks.

In relation to turnover problems, KTI states that "better trained operators stay on the job, because they are happier with their work – and with themselves."

It also points out that if a customer spends $4,000 to save $40,000 and has a 50% turnover, he would only have to spend $6,000 for the same $40,000.

"Even more important is the fact that the new people trained are fully productive in two weeks, rather than the more customary three months," the firm declares.

So next time the manager dreams of increasing the efficiency of his data capture operation he shouldn't overlook Katy, the keypunch girl. Maybe a new system is what he really needs, but he should evaluate methods that can improve the present setup before he jumps.

Consolidated Computer Sets Key-Edit Refinements, Cost

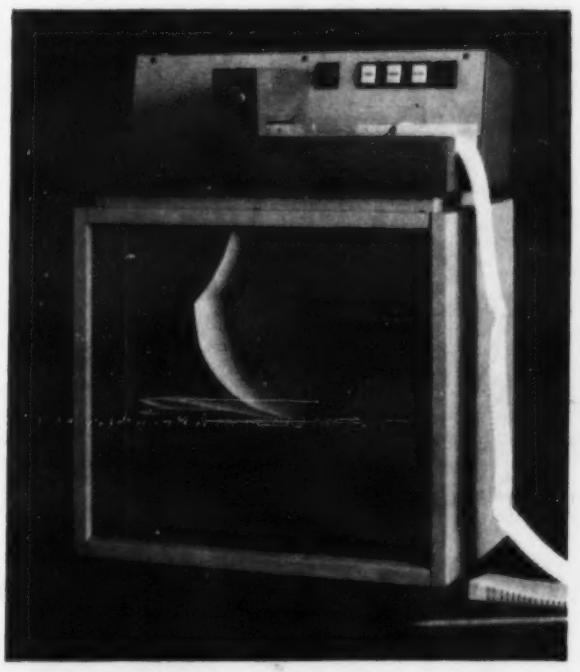
WALTHAM, Mass. – Five refinements have been developed by Consolidated Computer, Inc. for Key-Edit systems.

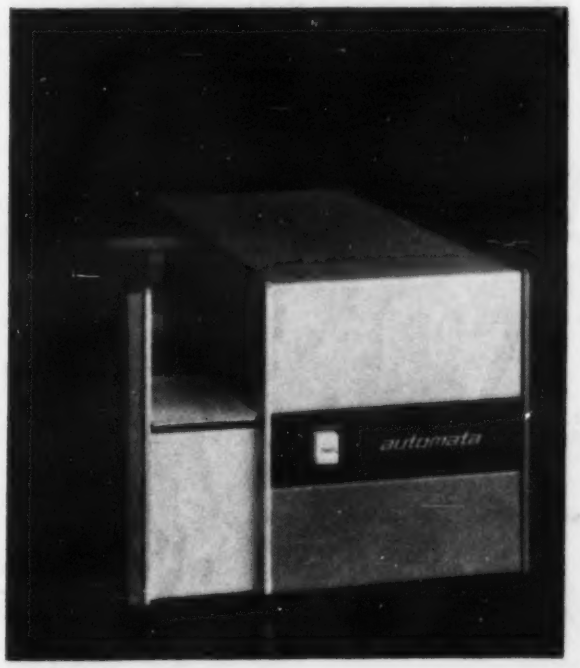
Four features are: direct connection to the multiplexer or selector channel of an IBM 360, at $375/mo; a communication adapter for transmission via standard 1,200 baud lines, at $120/mo; a 1,600 bit/in. output tape compatible with IBM 1,600 bit/in. systems at $400/mo; and a $50/mo transfer switch to interconnect keyboards where there are two or more systems providing a maximum capacity of 16 keyboards.

The fifth refinement is a line printer with 132 print positions at speeds ranging from 300 word/min to 1,100 word/min, priced at $350/mo.

Consolidated Computer is at 235 Wyman St.

TO GET DATA FROM HERE TO THERE, START HERE.





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On the left is the 8421, which reads continuous fan-fold strips at 1200 bps. The beauty on the right is the 3600 and it reads intermixed stacks of variable length documents at speeds up to 60 cpm. These documents include pencil-marked, keypunched, or preprinted cards.

The data integrity of both machines is unbelievable, but true. To provide this integrity our technical staff has built in such features as:

- Verifier-editor at the terminal
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And high reliability is guaranteed because the units have only three moving parts.

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• Unbearable input?

It takes a lot of berries to feed a big input-bound central processor.

That's why Inforex developed Intelligent Key Entry™.

Inforex feeds hungry CPU's. It does electronically what other forms of data entry do mechanically.

The Inforex system gathers data from eight keyboards into one disc memory unit. Data may be sight or key verified. Built-in logic performs check digits, left-zeros and balance totalling. Jobs are pooled onto 7 or 9-track compatible tape. Optionally, it will operate on-line directly to your central processor.

Keypunch/verifier functions. Starting with the familiar 64-character keyboard, each Inforex keystation performs all keypunch and verifier functions: Automatic check-digit computation. Automatic left zeros. No digit by digit keying is necessary. Electronic skipping and duplicating rather than mechanical. Auxiliary duplication or two additional levels of program control. Automatic + or — signing of fields.

Simultaneous entry and verification. All eight keystations input to one disc memory unit. Each keystation is assigned an area as it enters. Any keystation can access any assigned area at any time. Since each keystation has both sight and key verification capability, one keystation can verify work entered on another and if desired, verification can be done simultaneously with data entry.

Keyboard to tape functions. Inforex automatically pools input from up to eight keystations onto 7 or 9-track compatible tape. One easily entered statement transfers a series of batches. Only one keystation is required to initiate the transfer, and all keystations are functional during transfer. There are no cartridges to handle or identify, no special equipment needed for pooling.

Recallable programs. Each program has four levels of control. Once the program is keyed, it can be stored for future use and recalled by any operator merely by keying its appropriate program name. Up to 128 different program controls can be stored. There's no program card or tape mounting and no repetitive program control keying.

Self-balancing. Zero balancing is an integral part of the Inforex system. Each operator may accumulate a control total during data entry. Edit controls allow rapid correction. Adjustments to the balance total occur automatically during verification.

125-character records. With Inforex Intelligent Key Entry, the record length is variable up to 125 characters.

Full record display. For added accuracy, each keystation displays an entire 125-character record with moving cursor and position counter. The system has a forms capability that allows data entry and verification in a "fill-in-the-blank" fashion. Operator messages for direct interaction with the system along with search and paging of a file are standard.

Attractive office decor. Inforex design innovation doesn't stop with the components. Each Inforex keystation is built into an attractive contemporary walnut and black steel desk designed for operator ease and comfort. And remember, the system is electronic, not mechanical, allowing a quiet, comfortable atmosphere to work in.

Inforex monthly rental cost is $50 per keystation. $560 for control unit (up to 8 keystations). $960 for a complete 8 keystation system, including maintenance.

Inforex, Inc., 21 North Avenue, Burlington, Mass. 01803 or, Inforex AG, Dornacherstrasse 210, Basel, Switzerland.

"Inforex it."

The Term-mite stands alone.

It's the smallest, least-expensive, mass-produced key punch replacement on the market. With this tiny, $75-a-month, desk-top video terminal, you can cut computer input costs 20, 40, even 60%.

It doesn't make much sense to replace a key punch with some machine that's even bigger, more expensive and harder to operate. That doesn't eliminate the key punch problem; it just gives it a new name.

What you have to do is break out of the whole "write-it-down-here, key-it-there" system. That means source data capture. Simple, little stand-alone data recorders that can go anywhere. That anyone can use.

DID makes them. The Term-mite stands alone. You just plug it in and you can record orders, invoices, job tickets, credit reports, market facts or any other data — as it originates — onto reusable cassettes that can be pooled onto computer tape. Or, if you want, you'll be able to hook an army of Term-mites directly to the pooler. There's no communication equipment to buy for cable runs of less than 500 feet. The Term-mite stands alone.

If you'd like to learn more, write DID — Data Input Devices, Inc. — Derry, New Hampshire 03038 today or see us at the FJCC, Booth 3316.

Informatics 'Displayall' Debugs CRT Systems Off-Line

By Don Leavitt
CW Staff Writer

CANOGA PARK, Calif. – On-line CRT-based applications can be debugged "off-line" in batch processing mode, even before the terminals are installed, with Displayall, a software system from Informatics.

According to Informatics, the system has been designed to aid the systems analyst in structuring his application for the computer, and to aid the programmer in his implementation of the application. Used in conjunction with IBM's Basic Telecommunications Access Method (Btam), Displayall is said to provide maximum CPU utilization with minimal core overhead.

Actual display text desired by the systems analyst is written on forms provided, then keypunched and entered in the Displayall system which stores the data.

These stored displays may be recalled to the CRT screen or printer, if the system is being used off-line, by reference to an assigned display name.

The programmer can recall the display and see what information the analyst expects to have entered through the terminal. The programmer, in turn, codes the parameters which provide automatic editing of the data as it is entered by the operator. These parameters can be used, for example, to prevent anything except numeric data from being entered in a given field.

System Includes Executive

Informatics said that the Displayall system includes a multi-terminal executive so that the number of terminals is limited only by the hardware constraints of the installation. The system works in a full multitasking mode which allows separate terminals to be working on the same or different applications, asynchronously.

The handling of all local and/or remote terminals is said to be completely transparent to the programmer operator. Displayall handles all line control through Btam and ensures that all users of shared lines get equal use of the line, Informatics said.

The system interfaces with application programs written in Fortran, Cobol, PL/1 and Assembly Language. Displayall supports local and remote terminals under OS/360, and sells for $20,000.

Informatics Inc. is at 21050 Vanowen St.

T/S Network Links CDC 3300s, Builds Operating System to Support Users

MINNEAPOLIS, Minn. – A new time-sharing operating system has been implemented on the International Timesharing Corp. (ITS) network, to provide users with faster response time and assurance of continuous service in the event of machine problems.

ITS has installed its Centralized Remote Access Information Network (Certain) operating system on a pair of CDC 3300s near here. According to ITS, Certain manages the automatic switching of inquiries from one CPU to the other as the processors become available.

The switching is completely transparent to the user. From either processor, he has access to the same data bases and, if two 'read-only' inquiries come in at the same time, they can be handled simultaneously, according to ITS.

The system includes a security system with various levels of access to prevent disclosure of data to unauthorized personnel.

Accesses to the data base for updating, rather than 'read-only' inquires, do take priority, the company said, and momentarily lock out other actions until the updating is completed.

ITS stressed that, by having both its CPUs at one central location, and linked to each other on an 'as available' usage through Certain, the company can assure users a continuously available processing capability. Though ITS admitted that its approach relied heavily on extended communications lines, the company said that it provided a more dependable approach than time-sharing services that had several CPUs located across the country.

There is no initiation fee for the ITS service but there is a $100/mo minimum billing. Charges are accrued at $10/hr for connect time and twelve cent/sec for CPU time. For users operating in the background mode, the CPU time charge drops to nine cent/sec.

International Timesharing Corp. is at 4620 West 77th St.

Digiscan's DCS Microfilms, Regenerates Magnetic Tapes From User Archives

MELVILLE, N.Y. – EDP managers can get more effective use of their magnetic tapes and, at the same time, more security for their vital historical data files, by using the Data Compaction Service (DCS) to transfer files to microfilm.

According to Digiscan Services Inc., DCS uses precision graphic techniques to transfer data from magnetic tapes to microfilm. By reversing the logic of the recording process, DCS is able to regenerate the file in magnetic tape form, as needed, the firm said.

Digiscan said that the service acts as insurance against natural or man-made disasters since copies of the microfilm records are maintained at both the user's site and in a Digiscan vault. Complete privacy of data is guaranteed, the company said.

Data Is Filmed

Data from the magnetic tapes consists of points of varying levels of grey on the microfilm. The company said that each microfilm frame may contain up to 1,000,000 points or the equivalent of 250,000 bytes of recorded data.

DCS can handle data on either 7- or 9-channel magnetic tapes, the company said.

During the recording process, check sums are computed and stored on microfilm to insure precise regeneration. Accuracy of 99.99% is guaranteed on regeneration of data, the company stated. Turnaround time of 24 hours is said to be standard on batches of less than 24 reels of magnetic tape.

Prices for transfer to microfilm vary from $30/tape for a minimum order of 3 magnetic tapes, to $22.50/tape for orders on more than 10,000 tapes. Regeneration prices are $10/tape more than recording prices.

Digiscan Services Inc. is at 425 Broad Hollow Road.

Business Packages Available for 1130

NEW YORK – Users of the IBM 1130 continue to get commercial software support for their originally scientific oriented processor.

Packages, developed by Tripp Computer Associates, are available from Datasonics, Inc., for general ledger, accounts receivable, and equipment inventory and depreciation.

A project control system that can be used by any kind of business is said to be particularly useful for architects and construction firms. A system is also available to handle the billing of classified ads for newspapers and magazines.

The inventory system produces a report showing cost, monthly and year-to-date depreciation, and location of each item on the system.

The project control system is based on a disk file of identifiable tasks within projects. The system produces a schedule, and a work status and progress report. Aggregate costs for entire projects and a bar graph showing the work status pictorially, are also available, according to the company.

The newspaper billing system generates the first and up to 10 delinquent billings. It also provides sales distribution reports by salesman, income account area, advertising code and length of ad. Other reports are said to include collection agency list, outstanding bills list, payment and invoice registers and a trial balance.

All systems may be purchased or rented. Datasonics also said that it would provide the packages' capabilities on a service basis for those firms without an 1130. Rental prices of the packages range from $56 to $120 monthly.

Datasonics Inc. is at 663 Fifth Avenue.

Time-Shared PDP-10 Used by IMP To Build, Debug Mini Software

PRINCETON, N.J. – Installations with Data General Novas and Supernovas and smaller DEC processors will be able to prepare and debug their programs on a DEC PDP-10, using the Interactive Minicomputer Programming Environment (IMP) system developed by Applied Data Research (ADR).

IMP consists of an integrated set of software which includes editors, assemblers, and a minicomputer simulator called Mimic.

These programs, coupled with the file handling ability of the PDP-10, are said to provide the minicomputer programmer with resources and facilities that are not normally available to him.

ADR noted that the IMP system overcomes core size limitations, the lack of breakpoint facilities, and limited panel-light displays of relevant registers and flags typical of the minicomputers.

The IMP system is available to users via remote terminal access to ADR's PDP-10 time shared computer system or via special leasing arrangements for the user's own PDP-10 installation. It has been used in-house for nearly a year, ADR said.

Mimic simulators and associated assemblers are currently available or under development for Data General's Nova and Supernova and Digital Equipment's PDP-8 family (including the new PDP-8/E), PDP-7 and PDP-15.

On the ADR time-sharing system, users in the northeast can access IMP on dial-up phone service. There is a $100 initiation fee but no monthly minimum billing. Time used on ADR's PDP-10 is charged at the rate of $10/hr for connect time and a cent and a quarter per thousand words of core/sec for CPU time.

Applied Data Research is in the Route 206 Center, here.

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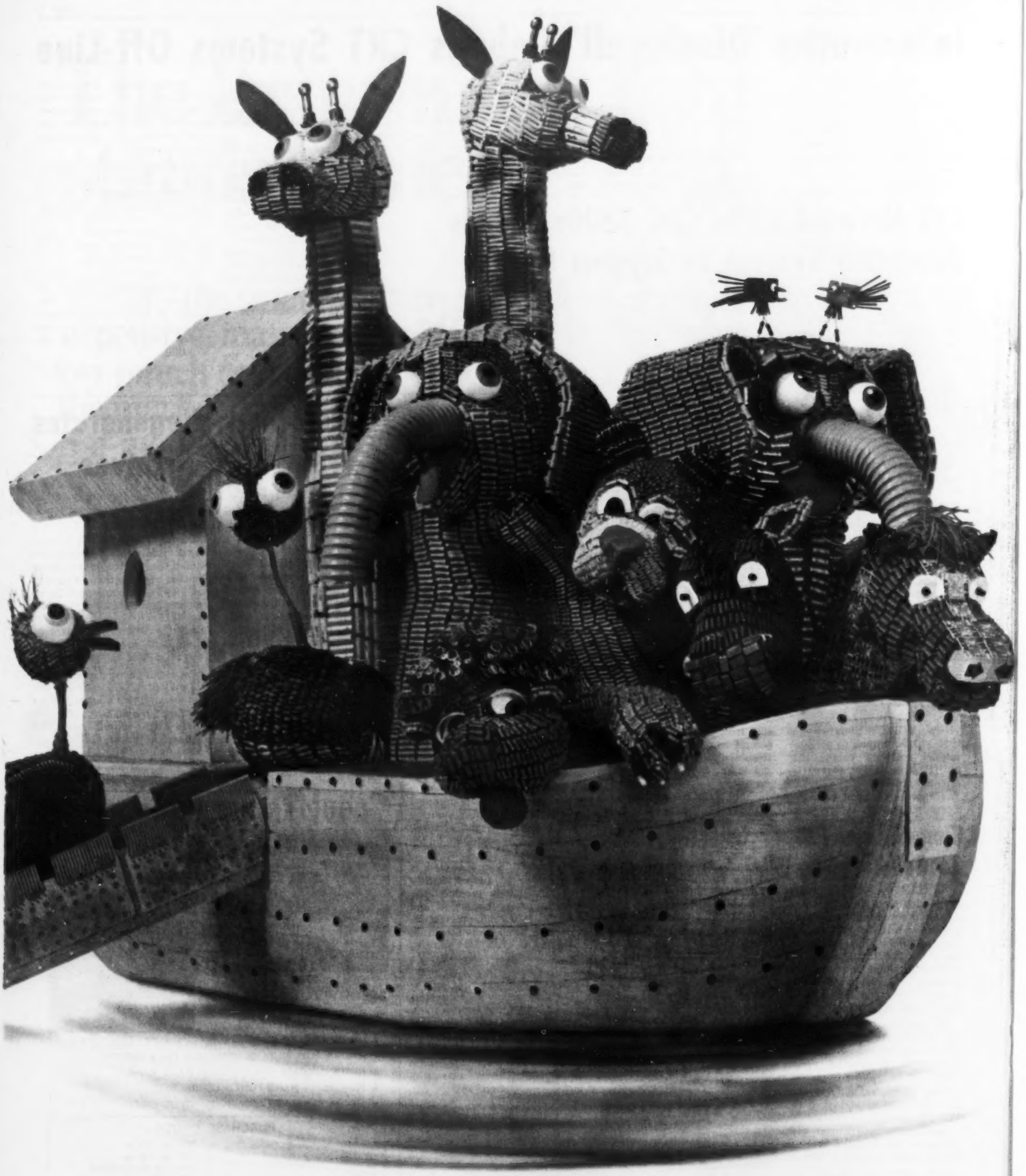

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Universal Assembler Interfaces With 360

LOS ANGELES – The Dynamic Universal Assembly Language (Dual), with which users are able to break away from machine-imposed and conventional language limitations, has been implemented on the 360, according to the developer, Proprietary Software Systems Inc. (PSS).

The 360 Adaptation is called Meta-360.

In the new version, the user is able to use his own code or his choice of any standard 360 language as a source language to generate object programs for a variety of "target" machines. These include, in addition to the 360 itself, the IBM 7094, the XDS Sigma 5 and 7, the Standard IC 4000, and the Monitor Data 708 minicomputer.

PSS said that Dual, including the 360 version permits the user to write his language so that his exact data processing needs can be met. Highly specialized industries that require particular jargon in their normal operation can use those terms.

Software houses, using Dual, can build general packages that could be adapted to specific user machines by compiling the programs through the desired "target machine" object converter module.

Dual is priced at $25,000, which includes the creation of linkages for the user's machine if it is not already available. PSS expects to be able to install Dual for any user within 30 to 60 days of receiving an order.

Proprietary Software Systems is at 11607 West Pico Blvd.

Accounting Package Generates Detailed Audit Trail on 360s

EVANSVILLE, Ill. – All accounting reports, journals and ledgers are completed on the first pass, and a detailed audit trail is automatically generated for accountants using Able the accounting language package from Evansville Data Processing Corp. (EDPC).

The package is said to combine standardized accounting procedures built into the Able logic, with user-oriented flexibility allowed by accounting language entries, to generate a variety of financial reports.

Although the current DOS/360 version is new, the concepts behind it have been developed over a five year period, the company said, on a CDC-oriented version.

EDPC claimed that there are no restrictions on the output formats produced by the package. Neither are users restricted to a specified chart of accounts nor departmentalization.

Adjusting and standard entries for all accounting and management reporting assignments are available. According to EDPC, these can include depreciation, interest calculations, expense accruals, prorations among departments and distributions.

The package requires 32K bytes of available core and a 2314 disk pack under DOS/360. An alternate arrangement can utilize two 2311 disk packs instead of the 2314, the company said.

EDPC said that it leases the program-loaded disk pack to the user for a first year charge of $4,500 plus travel expenses and for $450/year thereafter.

Evansville Data Processing Corp. is at 1010 South Weinbach Ave.

Cyphernet T/S Net Adds Enhanced Ecap, Analog Package

ANN ARBOR, Mich. – An enhanced version of the Electronic Circuit Analysis Package (Ecap) and a Continuous System Simulator (CSS) program have been added to the electrical library available on thy Cyphernet time-sharing network.

The CSS package, developed originally by Shared Applications Inc. for Cyphernetics, assists in the solution and manipulation of continuous simultaneous differential equations.

Cyphernetics Corp. spokesmen said that Ecap provides the design engineer with a means of studying both steady and transient performance of a large group of electronic circuits or networks. The Cyphernet version is said to give the user the capability of predefining the circuits he wishes to study. According to Cyphernetics, other Ecap versions require the user to enter the circuits each time the package is used.

Another feature of Cyphernet Ecap is its acceptance of free-format input and its provision for automatic error checks. The system notifies the user of the type of error and enables him to enter the correction.

Cyphernetics said that CSS provides analog capabilities on a digital machine. CSS allows the user up to 200 elements, 100 of which may be integrators. The user can select from 31 predefined function blocks to build his simulation. Shared Applications said that CSS uses a fourth-order numerical integration algorithm with automatic step-size selection and variation.

With CSS the system queries the user until all the information needed to perform the desired analysis is attained.

Cyphernet has a $100 initiation fee but no monthly minimum billing for the use of the electrical library. Charges are $10/hr for connect time and two cent/sec for connect time.

Cyphernetics Corp. is at Maple Village.

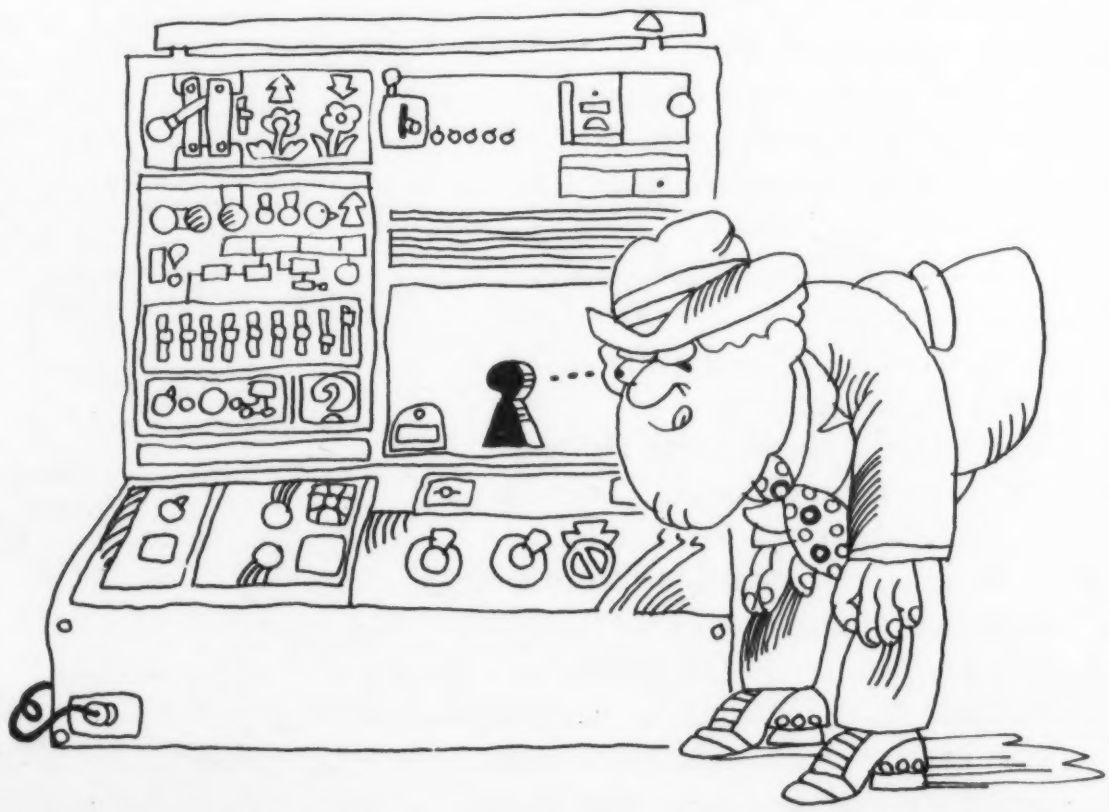
'Automail' Package Prints 360 Memos

WESTPORT, Conn. – Automail, a combination memo printer and selective mailing list generator, from Hygain Technologies Inc., costs only $375.

Automail is designed to prepare memos that are images of punched cards, which must include any spacing, punctuation or paragraphing desired.

Automail will operate on any 360 which supports PL/1 level D/F. The system requires a direct-access device and 130K bytes of storage.

Hygain Technologies is at 65 Whitney Street.



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First Ampex Disk Drive System Is 2314-Compatible

By Frank Piasta
CW Staff Writer

CULVER CITY, Calif. – The first plug-to-plug compatible disk drive from Ampex is designed to replace the IBM 2314 system, used with 360 and 370 CPU's.

Called the DM-312 disk drive and the DC-314 controller, the disk system is said by Ampex to offer twice the access speed of the comparable IBM units.

The speed announced by the company, 32 msec, average access, is approximately that of the majority of the 2314-type drives offered by other independent peripherals manufacturers. As do the others, Ampex achieves this speed by the use of voice coil actuators. Some of the other manufacturers to use this method are: ISS, Marshall, Telex, Peripherals General, Calcomp and, most recently, Control Data.

The speed advantage also makes the Ampex unit about twice as fast as the rest of the peripheral suppliers that use the IBM-type hydraulic actuators. These include firms such as Potter, some Peripherals General products, and Hitachi of Japan.

As is the case with the rest of the independent peripherals suppliers, the Ampex drives are completely hardware and data compatible with the IBM units, using IBM 2316 or equilvalent packs. Packs recorded by the Ampex unit, the company said, are fully interchangeable with IBM-recorded packs.

The Ampex units also share in common with the rest of the independents a startup time that is shorter than the IBM 2314. The DM-312 is ready for operation in 15 seconds, compared with the IBM warm-up time of 60 seconds.

The DC-314 control unit interfaces directly with all IBM models having a minimum data transfer rate of 312,000 byte/sec. The Ampex drives are self-monitoring and can provide off-line testing of one drive while others operate on-line. A spare disk drive module may be used with a standard eight-drive system, as with the IBM 2314.

Ampex has been unwilling to disclose the price of disk system beyond saying it can represent a savings to the user of as much as 18%.

Based on IBM lease prices, this could work out to about $1,650/month for one controller and a single drive. On the same basis, the price of a nine-drive system, including controller, would be between $4,700 and $5,000 per month, or roughly competitive with the other independent 2314-type drive suppliers.

Ampex expects to make the first deliveries of the DM-312 and the DC-314 in February, 1971.

Centronics Printer and CRT Terminal Feature Low Cost and Compact Size

HUDSON, N.H. – An impact printer designed to fill the gap between typewriter and line printer, and a compact CRT terminal, from Centronics Data Computer Corp., both offer the user a low price.

The line printer, the Mach I, operates at a speed of 165 char/sec. A serial printer, the unit's line rate depends on the length of line. The speed at 132 character lines is 60 line/min, while short lines can increase the rate to 150 line/min. Data input can be serial or parallel through an EIA R232B interface. The transmission rate can be up to 3,000 bit/sec, serial, or 75,000 char/sec, parallel. A full line (132 character) buffer is provided.

The print characters are formed by a 5 by 7 dot matrix, equivalent in size to ten-point type. Input code is Usascii and a 63-character set is provided.

A pin-fed platen is used, adjustable for forms as wide as 14 inches. Vertical spacing is six line/in. A vertical forms control, controlled by an 8-channel paper tape is provided.

The Model 101 has been priced at $2,400.

First deliveries are scheduled for January, 1971.

Model 301 CRT

Originally designed as a companion device to the company's Model 101 printer, the Centronics Model 301 CRT Keyboard Terminal is available as a separate device for use with any system in an on-line or off-line status.

The Model 301 is a compact and low cost input device, featuring a display of 132 characters in four lines of 33 characters each. Characters are formed by a 5 by 7 dot matrix using a 63-character Ascii code set.

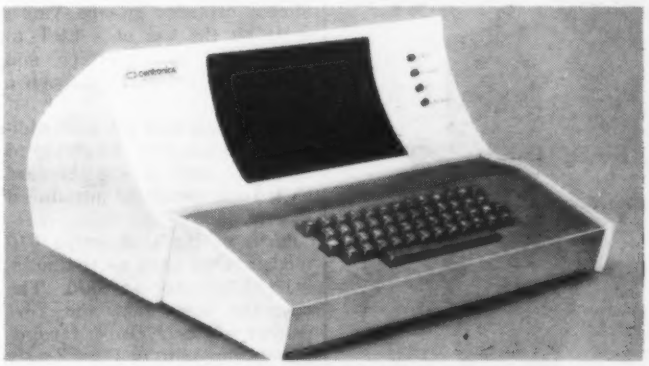
Four special functions are provided and include Bell, Line Feed, Return, and Delete. Indicator lights are provided.

Data transfer rates of 3,000 bit/sec, serial or 75,000 char/sec, parallel, can be accommodated.

The CRT terminal, the company said, broadens the applications for the printer by allowing Centronics to offer both units as a complete I/O package. Other uses suggested for the seven-inch screen unit are credit card checking, inventory control, and as part of a hospital information system.

The Model 301 is priced at $995 with quantity discounts available. First shipments are scheduled for January, 1971.

Centronics Data Computer Corp. is at One Wall St.



Centronics Model 301 CRT Terminal

Fabri-Tek LCM+ Can Replace IBM 2316

MINNEAPOLIS, Minn. – An alternative with better performance to IBM's 2361 core storage unit for the IBM 360 user is available from Fabri-Tek, Inc.

Called the LCM+, the add-on memory unit is available in models to suit the IBM 360/50, 65, 67 and 75 in capacities of 2-, 4- and 8-million bytes.

The Fabri-Tek memory is a direct plug-to-plug replacement for the 2361. It requires, according to the company, no changes in software or programming and connects to the IBM 8080 adapter used with the 2361.

Besides providing all operational functions of the 2361, such as two-way interleaving and shared storage, allowing the unit to be shared by two processors, the LCM+ features a memory cycle time of 2.8 μsec, on the 360/65, 360/67 and 360/75, for eight bytes. On the 360/50, the cycle time of the LCM+ is 3.5 μsec/4 bytes. By way of comparison, the 2361's cycle time is 8 μsec for all 360s.

The purchase price of the LCM+ is below that of the IBM 2361. The price of the LCM 50 + 1, a 1-megabyte unit for the 360/50, is $234,000, in contrast with the 2361's price of $296,385. The cost of the 2-megabyte units are $422,000 and $493,970, respectively.

The pricing of the Fabri-Tek memory is evidently geared to either purchase or long term lease, as the one year lease price for the one-megabyte model is $7,700, two year is $6,000, and three year is $5,500, not including maintenance. In contrast, the IBM 2361 leases for $6,495/mo, including maintenance.

The one-, two- and three-year lease prices on a 2-megabyte LCM+ would be $13,300, $10,300, and $9,500 per month, respectively, also excluding maintenance. The IBM 2361 price for the 2-megabyte Model 2 is $10,990/mo including maintenance.

Maintenance charges of the LCM+ are said by the company to be the same as that of the IBM units, $375/mo for the LCM+1, and $575/mo on the LCM+2.

The memory products division of Fabri-Tek, Inc. is at 5901 South County Rd. 18.

H-P Offers Six-Month Trial Plan

PALO ALTO, Calif. – A "lease-with-analyst" plan, designed for users about to install in-house time-sharing systems, will allow Hewlett-Packard 2000-series computer systems to be leased on a six-month trial basis.

If the user buys the services of an H-P systems analyst for one month at $2,000, he becomes eligible for the plan that allows him to cancel the lease agreement within six months, and pay only the lease charges to that date, with no penalty charge.

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Low Cost Compuscan OCR Aimed at Text Editing

By Frank Piasta
CW Staff Writer

TETERBORO, N.J. – Compuscan has announced a new OCR unit that is described as the lowest cost device designed for applications requiring extensive text editing.

Available in four models usable both off- and on-line to an IBM 360 with a variety of features and peripherals, the 170 can read upper and lower case typewritten characters on pages of variable size. The scanning rate is 100 char/sec.

The low cost of the system is attibuted to the use of a scanning device said to be new by the company. The scanner utilizes fiber optics, tiny wire-like threads of glass, which can carry an optical image, eliminating, the company said, the use of conventional lenses.

A recognition technique based on that of the earlier Compuscan 370 is used in the 170. The technique uses cross-correlation with some feature analysis, the company explained.

The Model 170 incorporates on-line correcting ability and editing facilities that are designed to make the unit attractive both for text input in the publishing industry and for input in EDP applications.

Output of the Model 170 can be either directly on-line to an IBM 360, or onto punched cards, punched paper tape, or magnetic tape.

Corrections are performed by the operator keying in the correct character.

Similar to the Model 170, the Model 171 adds peripheral equipment to allow either magnetic tape or punched paper-tape output.

The Model 172, in addition to the features of the 171, uses the Typescan program developed for the Model 370. It allows text addressing by line and word from a typewritten page. The correction page is first read into the device, followed by the original page on which the corrections are performed.

The fourth model, the 173, adds to the features of the 172, the ability to edit data that is already captured on tape. This is done by the use of a CRT to display the data on tape, and corrections are made through a keyboard.

Compuscan told CW that additional models with the ability to read any two of the standard OCR fonts would be introduced shortly.

Prices of the Compuscan 170 models range from approximately $35,000 to $55,000. The company said that the first models will be available for customer shipment in three to six months.

Compuscan, Inc. is at 900 Huyler St., here.

Unit Records On Cassettes

DALLAS – A digital recording system from International Computer Products, Inc. uses an IBM 735 Selectric as an I/O device and can record up to 700 101-character blocks on a Philips-type cassette.

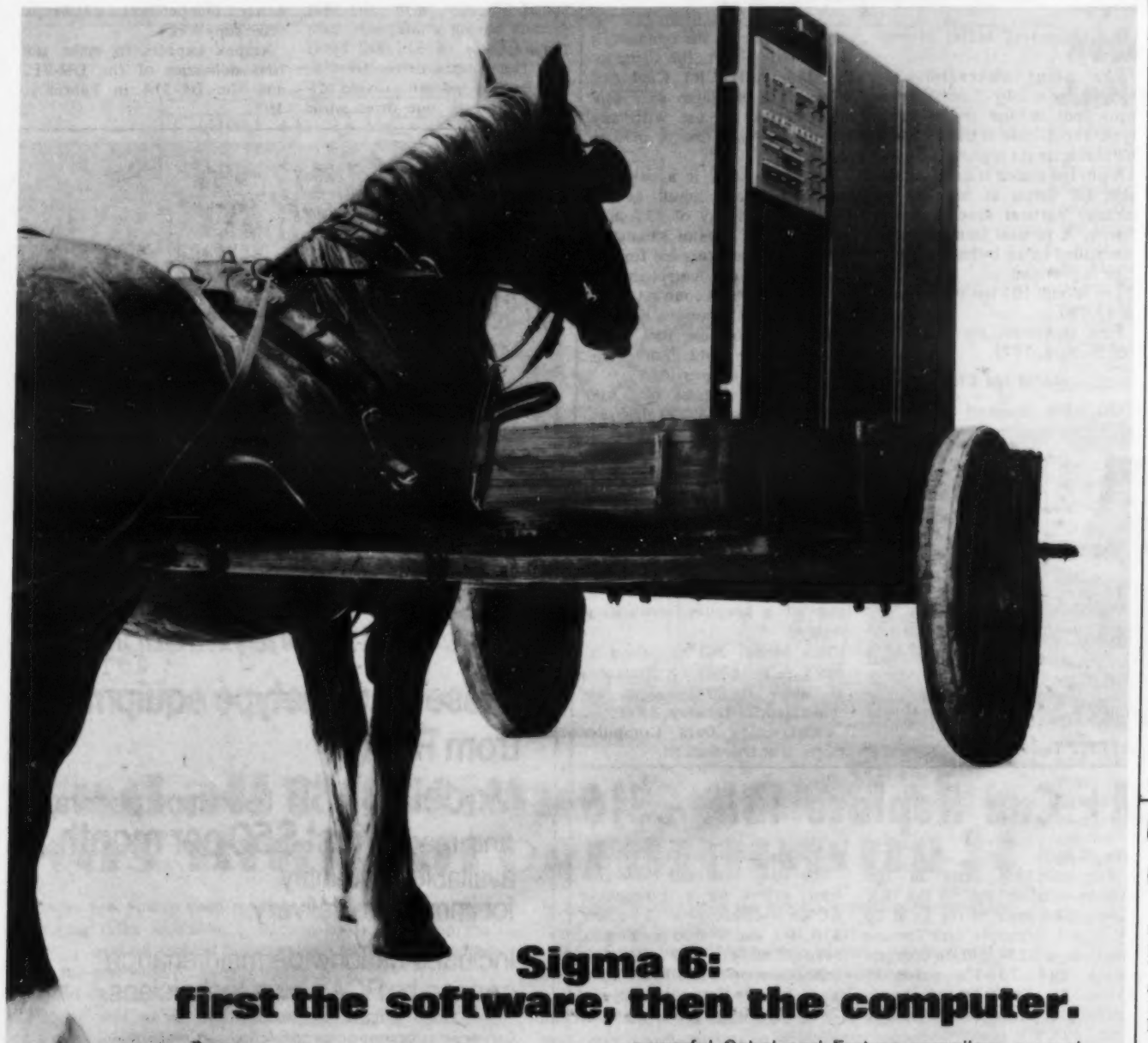
Called the Keycette, the device incorporates a 101-character buffer memory that allows data to be edited before it is written onto tape.

Prior to the writing of a record, the operator can eliminate a complete line with a reset key or can backspace to an error and retype the balance of the line.

Additional interfaces, the company said, are being developed for the Teletype Model 33 and IBM 029 Key Punch.

The Keycette is priced at $2,690, with an additional $200 charge for the Selectric interface.

The unit is available on a 30-day delivery.



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Differing Local Loops Seen by Datran, MCI

WASHINGTON, D.C. – Microwave Communications, Inc. (MCI) has proposed a new means of local transmission of business and data communications within cities. MCI filed with the FCC a "Petition for Rule Making" to establish a new service called "Carrier Distribution Service" (CDS).

The petition proposes to use the now unoccupied 38.6 to 40 GHz wave band, with open access for qualified communications common carriers.

At the same time, Data Transmission Co. (Datran) told the Commission that it proposes to use 11GHz frequencies for local distribution, if its application as a specialized common carrier is approved.

How the local loop, or final connection between a user and a carrier's transmission trunk will be implemented by the specialized common carriers, is one of

Communications

the questions now under study at the FCC.

An FCC spokesman told CW that the question of frequency allocations is probably going to be resolved separately from the other specialized common carrier issues.

The parties interested in the "virgin territory" of the giga-Hertz frequencies are "entirely different" from those concerned with the other problems, he said.

According to MCI, the subscriber using a specialized microwave common carrier service will have several alternatives when selecting means of local interconnection with these carriers: (1) he may use his own private microwave, or other facilities. (2) he may utilize existing telephone carrier's facilities. (3) he may use the facilities of a CATV system. (4) or, he may use the proposed CDS facilities, at the 40 GHz frequency.

Reacting to the MCI proposal. Datran said that, while it does not oppose the request for rule making filed by MCI, it considers it "premature." Developmental hardware for the 38 to 40GHz band will not be available for evaluation for at least a year and a half, Datran said. "Even now," the company added, operating limitations and costs of the equipment appear to eliminate it as a practical solution "for some years to come."

Although the Datran submission had not been evaluated in detail, an FCC spokesman said the commission staff would probably recommend a higher band than the 11GHz which Datran proposes.

Rules Changed

WASHINGTON, D.C. – Amended rules requiring communications common carriers to give actual notice to the public of tariff filings that would increase any charge or discontinue, reduce or impair any customer service, have been adopted by the Federal Communications Commission. The changed rules would also require a carrier filing a proposed new tariff with the Commission to submit data to justify the tariff at the time of filing.

The new rules provide that the publication of a proposed tariff that constitutes a rate increase must bear an effective date and give not less than 60 days notice to the public and to the Commission.

If the tariff publication proposes to increase any charge or make any unauthorized discontinuance, reduction ir impairman of service to any customer, the filing carrier must take appropriate steps to inform the affected customers of the content of the tariff publication.

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Bits & Pieces

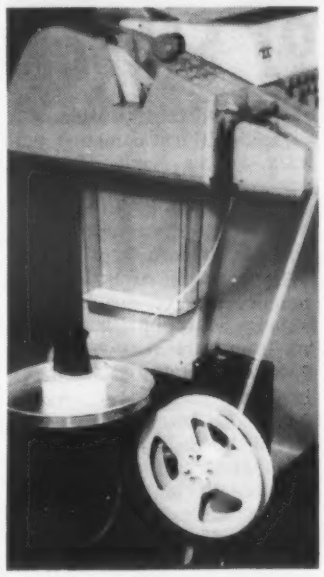
XDS Provides Remote Diagnostics

EL SEGUNDO, Calif. – Xerox Data Systems (XDS) users will soon be able to connect their computers by telephone line to a diagnostic laboratory in southern California for rapid analysis of their equipment malfunctions and for precise recommendations on how repairs should be made.

The remote trouble-shooting technique, tested in pilot studies with 28 selected installations, is scheduled to be offered to all XDS customers in 1971.

Using a number of specially designed testing programs, maintenance experts at XDS can, via telephone, run a remotely located computer system through a series of exercises that isolate the malfunctioning computer subsystem or element. The experts can then communicate to the repairman on-site step-by-step maintenance instructions.

In addition to decreasing the time required to diagnose and repair equipment, Xerox said that the laboratory could eliminate the need to send maintenance specialists to customer sites.



Numeridex 760 Data Center

Device Feeds, Collects Punched Paper Tape for Teletype Units

CHICAGO – A device that simultaneously performs the feeding and collecting of punched paper tape for Teletype Models 32 and 33 is available from the In/Opac division of Numeridex Tape Systems, Inc.

Called the Model 760 Data Center, the unit is said to offer perfect tape alignment at all times, without operator attention. The unit mounts directly on the Teletype terminal with no modifications necessary. It consists of a center-feeder and a powered take-up reel.

Priced at $95

The Model 760 Data Center is priced at $95 and is currently available from stock.

Numeridex Tape Systems, Inc. is at 4711 W. North Ave.

Accessories Catalog

GARDENA, Calif. – A free 110-page catalog of computer accesories and data processing room furniture is available from Computer Accessories Company.

The catalog features about 175 items including keypunch desks, tab card files, tub files, control panel storage racks, sorting equipment, card guides, forms binders, labels, noise-reducing equipment, bursters, decollators, and other products.

Copies of the catalog are available from Ron Ferdman at Computer Accessories Co., 131 W. 154th St.

Dataplex System Cuts Stock Transfer Costs

SEPULVEDA, Calif. – A turn-key system for handling the transfer of stock certificates is said to reduce costs and increase efficiency, while improving internal control, according to Data Instruments Company.

The heart of the transfer system is the company's Dataplex System which incorporates recording typewriters and a processor. The processor contains a minicomputer which uses a company-developed computer language known as Formol. The recording typewriter is operated as an ordinary business typewriter; however, it automatically records all information on magnetic tape cassettes as a by-product. This cassette data is then fed into the processor which automatically converts the data and prepares both new stock certificates and final journal records.

$2,850 Cost

The price of the Dataplex recording typewriter is $2,850, or it can be rented for $98 per month, including service. The Dataplex processor sells for $30,400 or rents for $960 per month, including service. There is no additional charge for the transfer system.

Data Instruments Company is at 16611 Roscoe Place.

B&H Has Tape Eraser

PASADENA, Calif. – An automatic tape degausser that is described as easy to operate is available from the Electronics & Instruments Group of Bell & Howell Company.

The degausser erases all kinds of magnetic recording tape on reels up to 16 inches in diameter and up to two inches in width.

The price of the TD-2903-4b degausser is $895.

Bell & Howell is at 360 Sierra Madre Villa.

Mark I Key-Cassette Price Is Cut by 22%

SUNNYVALE, Calif. – A 22% price reduction on Cybercom Mark I key-to-cassette systems will apply to existing customers as of Nov. 1.

The Cybercom Mark I system converts source data directly to magnetic tape contained in a cassette.

The price reduction, the company said, was the result of a market study that concluded that key-to-cassette equipment could replace keypunch machines regardless of the size of the installation if priced competitively.

Cybercom is at 432 Toyama Dr., here.

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Contact our Manufacturing Facility and Main Sales Office at 150 East Standard Avenue, Richmond, California 94804, Telephone (415) 233-8220 or our Central Sales Office at 4545 West Brown Deer Road, Milwaukee, Wisconsin 53223, Telephone (414) 355-1411.

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COMPUTERWORLD

education

Nov. 1 Filing Date for CDP Exam

PARK RIDGE, Ill. – Deadline for filing applications for the 1971 Certificate in Data Processing (CDP) examination is November 1.

The comprehensive, day-long exam will be given the third Saturday in February next year in over 100 test centers located in colleges and universities in the U.S. and Canada.

The exam serves as a method for recognizing a corps of individuals having knowledge essential to data processing and information management, according to R. Calvin Elliot, executive director.

Applicants for the 1971 exam must have three full years of experience in the EDP field and have completed the equivalent of two years of study in an accredited college or university. It is not necessary, as required for the exam in 1970 and in previous years, to have credit for two courses in electronic data processing.

DPMA membership is not required to take the exam. The fee is $50.

97 Schools Sign Up for Network

MINNEAPOLIS, Minn. – A large educational computer network, linking nearly 100 Minnesota schools to a complex service center in Honeywell's general offices, was unveiled recently in Minneapolis.

The network covers all geographic areas of the state and includes educational levels ranging from elementary schools to state public and private colleges.

The 97 subscribers currently include the Minneapolis and St. Paul senior high school systems, the Minneapolis junior high schools, the junior and senior high schools in the Robbinsdale school district, the entire 18-school State Junior College System, the University of Minnesota, Winona State College, Gustavus Adolphus College, the College of St. Thomas, Hamline University and the Iowa Lakes Community College.

Altogether, more than 100,000 students could benefit educationally from the Minnesota system in the 1970-71 school year.

Each school has at least one computer terminal on its premises which is tied in directly by telephone lines with a Honeywell 1648 time-sharing computer in Honeywell's Minneapolis offices.

Because of the nature of time-sharing, students in 60 schools could be "talking" by the Teletype to the Minneapolis computer at the same instant on 60 different subjects – and the computer's 60 different answers would start coming back in a split second.

Honeywell calls the system Edinet (Education Instruction Network).

Costs are held to the lowest possible levels because of the computer's time-sharing capabilities. Several pricing structures responsive to the school's individual needs are available. A new school joining the network can implement its computer instruction for $300/mo, according to Honeywell.

College Offers CAI to Schools

MILLERSVILLE, Pa. – Beginning November 1, Millersville State College will offer computer assisted instruction (CAI) programs to local public school districts.

So far, 19 computer terminals have been installed in school districts in Lancaster, York, and Dauphin counties.

Students from kindergarten through grade 12 will use the computer terminals in their respective schools for drill and practice lessons in one of three areas: remedial reading, mathematics and English.

Individual school districts will pay $5,000/yr rental for each terminal.

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COMPUTERWORLD

societies

Syracuse Site of ACM Conference

SYRACUSE, N.Y. – The Second Annual ACM NE Regional Conference will be held here November 13 and 14, at the Syracuse Country House.

The theme of the conference is "On-Line Systems," with a tutorial approach. The conference is open to the public and will be of interest to those involved with the installation and operation of an on-line computer system.

Persons interested in more information about the conference are invited to contact Conference Chairman, Richard E. Ward at Syracuse University.

Calendar

Nov. 10-12, Mexico City – Management Systems Conference sponsored jointly by the Institute of Management Sciences (Tims) and Department of Commerce, run concurrently with the Business Equipment Show in Mexico City. Contact: Dr. William Evers, IBM, Old Orchard Road, Armonk, N.Y. 10504.

Nov. 12-13, Miami – Cast '70 AIIE national conference on Computer Applications and Systems Technology. Contact: Cast '70, P.O. Box 1081, Miami, Fla. 33148.

Nov. 12-13, Montreal, Quebec – 1970: Canadian IEEE Symposium on Communications. Contact: The Institute of Electrical and Electronics Engineers, Inc., Technical Conference Service, 345 East 47th St., New York, N.Y. 10017.

Nov. 16, Houston, Texas – Computer Graphics Workshop. Contact: Jackie Potts, ACM SigGraph, Box 933, Blair Station, Silver Spring, Md. 20910.

Nov. 17-19, Houston, Texas – Fall Joint Computer Conference. Contact: Afips, 210 Summit Ave., Montvale, N.J. 07645.

Hopper to Receive Goode Award

HOUSTON – The American Federation of Information Processing Societies (Afips) will present its Seventh Annual Harry Goode Memorial Award to Cmdr. Grace Murray Hopper (USNR, Ret.) Thurday, Nov. 19, at a luncheon of the 1970 Fall Joint Computer Conference.

The award, named in memory of Dr. Harry H. Goode, former chairman of the National Joint Computer Committe (predecessor organization to Afips), was established by the federation in 1964 to encourage and honor outstanding contributions to the information processing field.

According to Brian Pollard, chairman of the Harry Goode Memorial Award Committee, the 1970 award will be presented to Cmdr. Hopper:

- For her pioneering work and leadership in the development of computer software, and for her impact and influence on the computing profession and her fellow colleagues.
- For her pioneering work and leadership in the development of important concepts for mathematical and business compilers, and for her contributions to the development and acceptance of English-language problem-oriented programming.
- For her outstanding work and continued efforts in the education and training of men and women for careers in computer science and data processing.

Cmdr. Hopper is currently on a special military leave of absence from the Univac Division of Sperry Rand and is serving in the Information Systems Division of the Department of the Navy.

The author or co-author of over 50 published articles on languages, compiling and standards, Cmdr. Hopper graduated Phi Beta Kappa from Vassar College, and received her M.A. and Ph.D. from Yale University.

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Data Communications Topic Of 3d International Forum

HOLLYWOOD BEACH, Fla. – On Nov. 30 through Dec. 2 up to 500 data communications and business systems executives and scientists are expected to attend the Third International Forum at the Diplomat Hotel in Hollywood Beach, Fla.

Keynote speaker, FCC Commissioner Robert E. Lee will discuss "Data Communications in the U.S."

A general session will cover the implications of developments in data communications for service bureaus; DP managers; computer manufacturers; peripherals; and systems and procedures.

Other sessions will stress techniques of data communications, terminal selection, and include a debate on "Service Bureau vs. In-House Time-Sharing."

Concurrent sessions will provide insight into the application of data communications to particular industries including: banking and finance; government; retail; and transportation.

The registration fee for the Third International Forum is $195.

For registration information contact: Forum Registrar, IBFI/PIA, Graphic Communications Center, 1730 North Lynn St., Arlington, Va. 22209.

Simulation Applications Set for 4th Conference

NEW YORK – The Fourth Conference on Applications of Simulation will be held here Dec. 9-11 with a total of 45 papers planned for presentation at 12 technical sessions.

There will be also a series of workshops and three tutorial sessions on the introduction to major simulation languages.

The conference is sponsored by six professional societies.

The registration fee will be $60 until Nov. 25 and an $80 fee will apply for registration at the conference.

More information may be obtained from P.J. Kiviat, Simulation Associates Inc., 1263 Westwood Blvd., Los Angeles, Calif. 90024; or M. Araten, Celanese Chemical Co., 245 Park Ave., New York 10017.

Position Announcements

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AMSTERDAM – The Dutch Government is considering assigning a decimal administration number to every citizen. In order to protect privacy, the numbers will be issued in a pseudochaotic order. Thus, nothing can be inferred from the number about a person's name, sex, age, or place of birth.

Merging and cross-referencing of files will, however, be facilitated.

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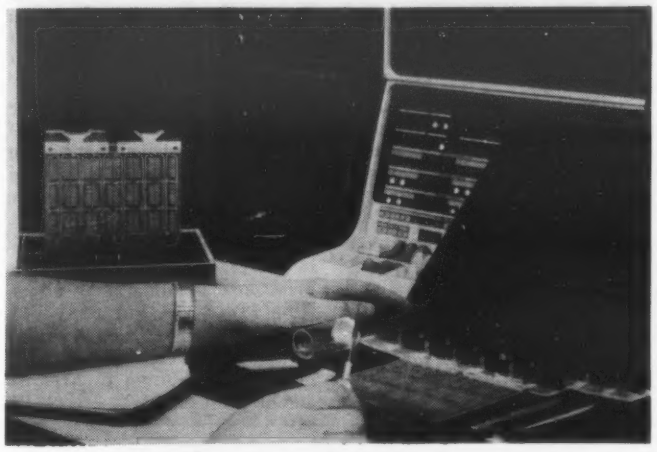

Lab Architecture

A student uses components in Digital Equipment Corp. Logic Design Laboratory to design and build computer logic modules and interfacing circuits. When the circuit is completed, the student plugs it into the connector block which is connected to a special access panel on the computer.

Computer Microfilm Unit Employs Solid-State Array

DOBBS FERRY, N.Y. – An OEM COM unit, developed by Sequential Information Systems, Inc. may be the first computer microfilmer to combine a solid-state light emitting diode array, a high resolution film drive and electronic shuttering.

Called the S/Com-70, the unit is available in both on-line and off-line models.

The on-line Model 1 is both hardware and software compatible with the IBM 1403 and 1443 printers and is connectable directly to the selector or multiplexer channels of System 360/25 and up. It is program compatible, the company said, with 360 OS and DOS.

The off-line Model 2 is available with a 9-track mag tape transport which accepts NRZI tapes with a density of 800 bit/in.

The S/Com-70 can print at the rate of 15,000 132-character lines per minute. The high speed is achieved through the use of an internal character generator that selectively energizes the light emitting diode array in synchronism with the film motion created by the film drive system.

Standard equipment includes a forms flash overlay system that superimposes a preprinted form on the computer printout text. The system uses a novel, full size form that is described as easy to prepare, rapid to change, and allows for simple insertion.

A programmable plug-board emulates the printer carriage control functions. The input is fully buffered and permits transfer rates as high as 500,000 char/sec. Output is on 16 mm unperforated film in 600-ft magazines.

The company said that the price of the unit will be determined by negotiation with the OEM buyer, but indicated that it will be less than $50,000. The company has scheduled production of the units to begin in May 1971.

Sequential Information Systems, Inc. is at 145 Palisade St.

Punched Card Equipment

GSA to Replace IBM Machines

WASHINGTON, D.C. – The Federal Government has made another move to decrease its reliance on IBM for equipment – this time in the field of punched card equipment.

The administrator of the General Services Administration (GSA) Robert L. Kunzig, announced last week that the GSA planned to expand its existing program of replacement of punched card accounting machines rented from IBM with machines available from other sources at lower prices.

21,000 Rentals

The number of machines presently rented from IBM in the federal establishment is approximately 21,000, GSA sources said. While it is improbable that all of the machines will be replaced at once, that is the overall object of the program, the source indicated.

The administration's Federal Supply Service has had contracts with five independent leasing firms for the replacement of IBM punched card machines since last March, but to date only 900 units have been replaced. The 900 units cover 34 different models and types, GSA said.

The five firms presently holding replacement contracts are Cyber-Tronics Leasing Corp., New Hyde Park, N.Y.; DPA Inc., Dallas; International Data Products Inc., Cleveland; LMC Data Inc. and MAI Corp., both of New York City.

'Early Establishment'

In last week's action, GSA started an inquiry with these five firms and the "rest of the punched card machine industry" which will lead to "early establishment" of similar contractural arrangements for additional quantities of the presently covered 34 types of machines.

In addition, GSA said that it planned to extend the program to additional types and models of punched card equipment under the new "extended" program, including non-IBM equipment.

Under the present program, the government will replace all of the machines "practical," but GSA officials noted that the capacity of the independent leasing companies was probably less than the 21,000 units presently in the inventory.

This is the latest in a series of moves by various government agencies aimed at cutting costs by replacing equipment leased from IBM with either the same or equivalent equipment from other sources.

Some industry sources claim that the programs – both in the replacement of IBM peripherals with plug-to-plug compatible units and in the punched card equipment field – have been "lagging" behind early expectations.

GSA officials admit that the programs have been slow, but said that the doors have always been open to independents in both areas, and that interest – especially in the area of independent peripherals – has been disappointing.

Good Reasons

In addition, they said there are often very good reasons for not replacing presently installed equipment – such as system peculiarities.

In addition, much of the punched card equipment presently installed has accessories that are not available from the independent leasing firms, they said.

"It's not all black and white, unfortunately," one source added, indicating that "if it were we would be able to come to grips with it much more quickly."

Where equipment can be easily replaced, however, the source said, "we damned well want it replaced."

Under punched card replacement programs in the past the individual government agencies would decide which equipment to replace and when, GSA sources said.

However, that was changed last August, they added, when the administration told all agencies to clear procurements through it – and began to force some replacements.

When the administration now determines what equipment is available from the independent leasing firms, it will begin procuring it for the agencies under the new policy, with formal bids on equipment expected to come in December of this year.

The savings are sizeable, GSA sources indicated. They said that they expected to save up to $2 million per year on rentals in the present punched card replacement program.

VIP Systems Sues to Prevent IBM Sale Of T/S Services, Asks for $15 Million

WASHINGTON – Another small, Washington-area service bureau has filed antitrust action against IBM.

VIP Systems Corp. is seeking to bar IBM from selling time-sharing services as well as treble damages for injury it claims exceeded $5 million.

The VIP suit contends that IBM deliberately provided faulty service to customers competing with the Service Bureau Corp. (SBC) from September 1969, to April 1970. The suit specifically concerns a text-editing service provided by VIP that competed with similar SBC offerings from 1966 until SBC dropped the service in July of last year.

An IBM spokesman called the charge "entirely without merit," and drew attention to a suit IBM filed against VIP in March, seeking to collect $300,000 IBM contends VIP owes it for rental fees. VIP filed a counter-claim in April.

The VIP suit also claims that IBM sold its text-editing service at an artificially low price in order to destroy competition and sell IBM equipment. Even after SBC discontinued the service, VIP says the parent company prevented it from servicing customers through deliberately faulty service.

This summer Computer Graphics also filed antitrust action against IBM after prolonged disputes involving faulty service and claims and suits concerning overdue bills [CW, June 17].

The Computer Graphics suit revolved around its contention that the Magentic Tape Selectric Composer is really a computer.

Computer Graphics was also involved in a typesetting service.

In 1968 IBM transferred its time-sharing services to SBC, apparently in order to avoid a Justice Department investigation.

The Service Bureau Corp. was organized following a consent decree signed by IBM in 1956. Among other things the consent decree bars IBM from operating a computer service bureau business as part of the parent company. SBC is supposed to be entirely separate from and independent of IBM.

Bauer Cites Need for U.S. Antitrust Suits vs. IBM

LOS ANGELES – Government antitrust action against IBM will permit independent software companies to become "the architects and general contractors of computer systems in the 1970s," according to Dr. Walter F. Bauer, president of Informatics Inc.

Speaking at the 21st annual Western Systems Conference, Bauer said such action "will prevent IBM from obtaining a stranglehold on system design and software contracts by underbidding software companies at unrealistic prices in order to obtain subsequent hardware orders.

"The pending Department of Justice suit against IBM states, in effect, that the hardware manufacturer should not be allowed to impede the development of independent software companies," Bauer said.

"Thus far the antitrust considerations have focused on software products. System design contracts, while covered in the suit, constitute a dimension of the problem that has received far too little attention.

"This antitrust problem of the 70s," he predicted, "ultimately will be solved the same way a similar problem was solved by the Consent Decree between IBM and the government in 1956.

In that action, IBM was forced to split off its Service Bureau Corp. as a separate entity to discourage low pricing of data services or machine time.

"When hardware companies are forced to spin off software activities in a like manner, fair competition will result," Bauer said. "Then companies competing for hardware orders will not be stymied by bias in specifications, and software companies will become the architects and general contractors of system design and implementation as they should be.

"Complete separation of software operations into autonomous entities, subject to separate accounting, is the only way, in my opinion, to eliminate tie-in sales of hardware and software that often add up to unfair competition," he added.

Three Estimates Differ

Just How Much off '69 Pace Are Domestic Shipments?

By Michael Merritt
CW Staff Writer

So what is happening to computer business, anyway?

The experts don't quite agree. At a press conference, Frederick G. Withington of Arthur D. Little, Inc. announced some preliminary figures from an ADL study on the state of the EDP industry.

At the end of last month Withington estimated that domestic shipments of general-purpose computers would be "somewhere between $3.5 and $4 billion," a drop of 36% to 27% from his estimate of $5.5 billion for 1969 shipments.

(In a more recent interview with CW, Withington said the 1970 figures had been revised to $4.1 billion, or a 25% decrease in shipments.)

On the other hand, the International Data Corp., publisher of *EDP Industry Report*, has estimated 1970 shipments at $4.52 billion, down only 7.4% from $4.88 billion in 1969.

And on the third hand, a Department of Commerce report issued last month says that the value of shipments will be an even $4 billion, down 5% from $4.2 billion in 1969.

Just How Much?

So everybody agrees that domestic system shipments are off last year's pace, but there's considerable difference over how much; the difference in absolute value depends to a degree on each researcher's definition of what he's measuring, and even so, all three 1970 figures are in the same ball park.

And everyone has faith in his figures. Walter Misdom, IDC's director of industry analysis says: "We only see a 7% to 10% drop in the value of new-built system shipments. There has been no dramatic drop in employment at the major EDP suppliers, which would have to follow from such a drastic drop in business.

"We also disagree [with ADL] on the cause of the drop. We think it is due foremost to the age of the third generation systems, exemplified by the 360 which is in its sixth marketing year and fifth year of production. The economy has had an effect, certainly, but primarily on the smaller companies in the business; the mainframe manufacturers, for the most part, are doing reasonably well."

Commenting on Withington's contention that "a severe depression" in the aerospace and R&D fields has also hurt business, Misdom said that aerospace and R&D constitute only 5% to 10% of the mainframe market.

ADL's Withington: "With due respect to IDC, our indications simply go the other way. We have watched the behavior of 100 to 200 companies, and we have access to the shipping figures of one large manufacturer, and his figures on the others .... We have data that a lot of orders [on the books at the beginning of 1970] flew away, shifted to 370s, were stretched out, or just dried up. Orders didn't materialize into shipments."

Commenting on the lack of layoffs, Withington noted that there have been layoffs at CDC and Honeywell, and that there is "a very strong rumor in the industry" that there have been layoffs at IBM. He also said that some manufacturing personnel are now busy building 370 generation equipment that won't be shipped until next year.

IDC's James Peacock, editor of *EDP Industry Report*, replied that its estimate is also based on a broad sampling of user purchasing patterns, measured through a survey of 600 users conducted for IDC's Corporate Planning Service. He said the survey showed that shipments of new CPUs are way down, but increases in shipments of add-on core, more disk and tape drives, and more terminals are taking up most of the slack. He added that IDC has manufacturers' figures available as well.

The Commerce Department estimates, according to James N. Carr, co-author of the report, are based on figures provided by the Bureau of the Census. The Census Bureau, in turn, gets it figures directly from computer manufacturers, he said.

So all three estimates have input from manufacturers, and two have sampled users' budget plans, while the third should have numbers that approximate coming from the horse's mouth.

What's really happening to the industry? Well, its pretty sure mainframe shipments are down, from 5% to 25%, but if anybody has the real answer he's probably locked somewhere in the basement of a building in Armonk and he's not talking.

Disk Crashes–Part 1

The Two Primary Defects Are 'Invisible'

By E.E. Kirsch
Special to Computerworld

There have been frequent reports of head crashes by disk pack users [CW, May 27]. The rate of occurrence varies from 50% or more for users of non-IBM compatible disk packs to 10% or less for users of the IBM-compatible pack.

From the user's viewpoint, these head crashes are costly. Not only does he lose the use of the disk storage drive unit until its heads have been cleaned and checked for damage, he also loses valuable computer time in trying to reconstruct data stored on the damaged pack.

It is probable that a disk pack and the read-write head can survive a single head-disk contact if it is not too severe and if it is detected and corrective measures taken.

Unnoticed

Frequently, however, the initial head-disk contact goes unnoticed. Without corrective measures, such as thorough cleaning of the disk pack and cleaning and polishing the read-write head, the head-disk contact may dislodge coating material and propagate additional head crashing of increasing severity that can easily lead to complete destruction of the disk pack and all the read-write heads in the disk storage drive unit. The seeds for such a catastrophe may well have been laid during the manufacture of the pack.

Many Causes

Head crashes can result from many causes. It is difficult, if not impossible, to separate cause and effect once the head crash occurs. Quite often the agent that caused the crash, such as microscopic particles or a transient vibration, is either not visible or is no longer present after the crash occurs.

Too often the agent that caused the crash merely served as the trigger for an event that was on the verge of happening.

The fact that a particular disk pack has been on a drive several times is not in itself proof that the disk pack is free from fault if a head crash occurs. Each time that a disk pack is in service it may well be operating marginally in so far as flying the read-write head is concerned and may be waiting for a chance to trigger the head crash.

Disk Defects

There are two primary disk defects that can lead to head crashes. One is oxide (or plating) protrusions about the normal disk surface and the second is localized out-of-flatness condition of the disk substrate.

A secondary defect, lack of impact resistance, which is determined by the coating formula, becomes operative only after a head crash occurs, but is then responsible for the speed with which additional head crashing is propagated.

The two primary disk defects that can lead to head crashes are invisible to the untrained eye. Because of the minute distance separating the read-write head from the disk (approximately 1/30 the diameter of a human hair), a very small defect in either the magnetic coating or the disk substrate can lead to head crashing.

In fact, surface protrusions are microscopic in size. The small magnitude of the defects makes it difficult for the pack manufacturer to detect them.

The problem is further compounded by the fact that pack manufacturing is a very competitive, high-volume operation, and thus limits the costs that can be incurred in inspecting the entire surface of each disk.

There are solutions available, however, which minimize the costs and insure that disk packs shipped to the user will be free of defects that lead to head crashing.

This is the first in a series of articles on what can be done during the process to help prevent the occurrence of head crashes on disk packs.

E.E. Kirsch is president of Three Sigma, Inc., a subsidiary of Computest Corp.

Federal Government Eyes 2d Generation Equipment, Not 3d, for Replacement

WASHINGTON, D.C. – The Federal Government won't be throwing out its third generation equipment in favor of the new IBM 370 and RCA 2, 3, 6 and 7 machines.

But the government is considering replacing its second generation equipment.

The replacement of third generation equipment with such systems as the new IBM 370 and the RCA 2, 3, 6, or 7 machines would "probably be improper" from a procurement point of view, according to one source.

A twilight area, however, exists. If a federal agency does not want to reprogram its current system and wants a better cost/performance ratio, "that would be a more legitimate" reason for its replacing a 360.

IBM claims that its 370 can emulate some 360 models and it gives a better cost/performance break despite initial higher cost. At the same time, RCA "seems to be saying the same thing" with its new computers.

There is little likelihood, though, according to the source, that the Fed would do any large-scale replacement of 360s within the next 12 months.

However, the largest using agency within the government, the Department of Defense, has "under study" a policy regarding possible replacement of System/360s. DoD is preparing to discuss with the procurement watchdog agency, the General Services Administration, the formulation of some sort of policy to meet the possibility of defense organizations requesting upgrading to a 370 or changing to one of the new RCA systems. No commands within Defense have as yet made such a request.

Any waiver to competitive procurement, though, is unlikely, according to Col. Joseph B. Warren, DoD's Deputy Comptroller for Data Automation.

Requests for non-competitive buys are judged individually and must meet one of three general criteria:

- There's no time to conduct a competition.
- Only one system can meet the requirement.
- One system has an overwhelming economic advantage (such as conversion) over all others.

At present, about 70% of the computers installed in federal agencies are second generation machines that will be phased out during the next three to five years.

Some sources at the procurement level in the federal establishment are indicating that these units will probably be replaced by the new machines – skipping the third generation completely.

Others, however, indicate that prices for third generation equipment might fall far enough to make them attractive for purchase by present users of second generation devices.

RCA Designs Light-Sensitive Card Reader

PRINCETON, N.J. – Development of a computer card reader consisting of a light-sensitive thin-film circuit deposited on glass has been announced by RCA.

The new device – an integrated circuit 5,000 times larger in area than the standard type – is a flat array of 960 photosensitive elements, plus auxiliary components and interconnections, deposited on a 4 in. by 9 in. plate of glass.

In its present form, the unit is laid out as a computer card reader containing 960 photoconductive elements – 12 rows of 80 elements – that match the 960 positions on a computer card. Wherever a hole has been punched in a card, the corresponding photoconductive element senses light and, in turn, provides an electronic signal.

Each of the 960 elements in the sensor array consists of a "lateral-flow" photoconductor in series with a thin-film Schottky diode connected to mutually perpendicular address strips. Diode action is obtained by the use of dissimilar contacts to the photoconductor.

The photoconductive material is deposited in islands in the first step. The second deposition is of nickel backed by gold to form the cathode electrodes and portions of both the horizontal and vertical address strips.

The third deposition provides cross-over insulators consisting of SiO plus CaF_2. The last deposition is of tellurium backed by gold to form the anode contact to the photoconductor.

The arrays have been tested with standard punched cards 1/16 in. from the sensor surface. Illuminated by a 10 W fluorescent tube, the sensor provides a sequential-output signal for each position in the entire card in 2/3 sec.

Bridge Data Readers Handle 80-, 96-Column Cards

PHILADELPHIA – Bridge Data Products has three new card readers that can read both 80- and 96- column cards – the Model 8800 reads both 80- and 96-column cards, the 8060 reads 80-column cards, and the 8600 reads 96-column cards – at speeds that are double those of the company's current readers.

With the three new models, Bridge Data has a product line of card readers with capabilities ranging from 300 card/min to 1,000 card/min.

The new Model 8800 multiple card reader, for example, handles 80-column cards at 650 card/min or 96-column cards at 1,000 card/min. The firm's original 8096 multiple card reader was developed with a capacity of 300 card/min for 80-column cards and 500 card/min for 96-column cards.

The Model 8060 reads 80-column cards at 650 card/min compared with BDP's Model 8000 which has a rate of 300 card/min.

And, the new Model 8600 reads 96-column cards at 1,000 card/min, twice the rated capacity of the company's Model 9600 unit.

The readers are said to be characterized by their simplicity of design, high reliability, low initial price, and maintenance-free features.

Each model comes complete with hoppers, transport, stackers, electronics, read head, skins, and interface or as a mechanism which consists of hoppers, transport and stackers.

In OEM quantities, the Model 8800 multiple card reader is being introduced at a cost of $2,500. The Model 8060 is priced at $2,000, and the Model 8600 at $2,250.

Bridge Data Products is at 738 South 42nd St.

Auricord Announces End-of-Tape Sensor

LONG ISLAND CITY, N.Y. – Auricord Division of Scovill Mfg. has developed a new end-of-tape sensing assembly, the SS-1, for use with its CAS-1 and CAS-3 cassette tape decks.

The Auricord SS-1 Sensing Assembly utilizes a 2N5777 Silicon Photo-Darlington transistor and a micro-miniature lamp in a guide post to sense a clear spot through the tape. The micro-miniature lamp is rated at 5,000 hours of life.

The Sensing Assembly can be provided with or without pre-amp, logic board and relay assembly in an electronics package, and is available from stock.

Auricord Division is at 35-41 29th St.

Reel Motor Has Long Life

CLIFTON HEIGHTS, Pa. – A new dc torque motor for driving computer tape reels has been introduced by the Clifton Division of Litton Industries.

The Clifton reel drive motor uses a solid gold alloy commutator rather than an ordinary copper or gold-plated copper commutator, and specially formulated magnetic material alloys which eliminate the problem of degraded motor performance due to "plugging," i.e., the instant reversal of voltage polarity common in reel drive applications, the firm said.

Clifton Division is at Maple at Broadway.

Hi-G Announces Modular Power Supply

WINDSOR LOCKS, Conn. – Designed for application in segmented or projected alphanumeric readouts, illuminated switches and keyboards, the Model 7065 modular power supply is now available from Hi-G, Inc.

The unit, with a hybrid integrated circuit regulator provides a regulated 6 Vdc output of up to 8 A at 50°C. Remote sensing is said to compensate for load drops up to 1.6Vdc.

The output is adjustable to ±0.5 V.

The firm is located at Spring St. and Rt. 75.

Recorders Improve Signal Acquisition

PALO ALTO, Calif. – The new Biomation 610 Transient Recorder can improve the high

OEM Products Roundup

frequency signal acquisition capability of computers used in scientific research applications, the firm claimed. The unit provides, in one economical package, an input amplifier, high speed A/D converter, buffer MOS memory, and appropriate triggering and interface control logic.

The 610 is specifically designed to capture single shot transients or slowly repetitive signals with rise times as low as 250 nsec, and holds their digital equivalent indefinitely. The user can look at the stored analog signal on an oscilloscope or make a permanent record on a recorder, and then transfer the stored digital information to a computer or signal averager for analysis or further processing.

The Recorder is priced at $1,750. Biomation Corp. is at 1070 E. Meadow Circle.

North Atlantic Converter Bows

PLAINVIEW, N.Y. – North Atlantic's Model 546/31 Synchro-to-Digital Converter translates analog position data developed by synchro sensors, into precise digital values for entering into a digital computer. The unit was designed for automatic checkout equipment (ATE), where it interfaces between a computer used to call the test shots, and the avionics, navigation, flight control, data recording, and other equipment undergoing automatic calibration and test.

Model 546/31 is qualified to MIL-T-21200 specifications. In addition, Model 546/31 embodies an integral input multiplexer that permits 10 analog data channels to be interrogated as required by the controlling computer.

Model 546/31 is available within eight weeks from receipt of order. Price of the unit is approximately $8,100. North Atlantic is at Terminal Drive.

If your university comp center offers just batch, talk to little Bowdoin about their big computer.

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Matter of fact, you might be surprised where the terminals are right on your own campus. Or how many. Check engineering, physics, biology. Try the psychology and economics departments. The hush hush projects.

They could be everywhere. And at $1000 a month each for service, the cost adds up.

Ultimately, it's cost and performance that convert comp centers to PDP-10s. For the service fee on 20 timesharing terminals, a college could own a PDP-10. And get batch and real-time processing for free.

California has several universities that think the way Maine does. And Texas and Michigan and. . . . Isn't it worth a call to find out if a multi-language, timesharing, batch processing, real-time, money-saving PDP-10 is right for your comp center?

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financial

Strike and Economy Cited For RCA Earnings Drop

NEW YORK – RCA sales and earnings in the third quarter of 1970 declined under the adverse impact of he longest strike in the company's history, plus continuing softness in certain key sectors of the national economy, according to Chairman and President Robert W. Sarnoff.

Third quarter earnings totaled $12.1 million on sales of $805 million, compared with $40.8 million in net profit and $846 million in sales for the comparable period in 1969. Earnings per share dropped to 16 cents from 59 cents.

Net profit for the first nine months of 1970 was $54.4 million, down from the record $110.6 million a year earlier. Earnings per common share were 75 cents, compared with $1.59 a year ago. Sales amounted to $2.38 billion, compared with $2.47 billion in the first nine months of 1969.

"The September 15 introduction of a new series of RCA computers, plus a new business policy designed to bring IBM users over to RCA, generated a degree of momentum we have never known in our computer operations," Sarnoff said.

"In only four weeks, orders have come in for the lease or purchase of the new computers having a sales value of $85 million. We have already exceeded our expectations for these systems for all of 1970.

"Significantly, more than a third of the orders were from customers coming to RCA for the first time, and most of these were from IBM users. We also are achieving a major penetration of the government market, with twenty new accounts obtained thus far in 1970 from federal agencies," the RCA president said.

"The initial reception of our new computer line has bolstered my conviction that our goal of second place in the domestic computer industry, with a 10% market share by the mid-1970s, is both realistic and attainable."

The 101-day strike interrupted or slowed won the production of computer systems, defense and space systems, solid-state devices and electronic components, as well as other consumer products.

RCA's government business continued to decline, reflecting cutbacks in defense and space programs. The decline was intensified by the strike, with production curtailed in several divisions involved primarily in government work, Sarnoff added.

Viewing the economy generally, the RCA chief executive predicted a period of moderate expansion ahead.

Sycor, EMM Financing Arrangement Replaces April 13 Agreement

LOS ANGELES – Electronic Memories & Magnetics Corp. and Sycor, Inc. have revealed the terms of a new financing arrangement for Sycor. This arrangement replaces the agreement-in-principle between EMM and the terminal maker announced on April 13, 1970.

During the course of 1970 EMM has purchased from Sycor $2.2 million of 6% convertible notes. Under the arrangement announced today, Delta, N.V., a parent of Coordinated Apparel, Inc., one of the founding stockholders of Sycor, will purchase $1 million of 6% convertible debentures.

In addition, Delta, N.V. and EMM will receive options which expire Dec. 31, 1970 to purchase an additional $2 million and $800,000, respectively, of Sycor securities.

Assuming exercise of these options, EMM's securities will be convertible into a total of 750,000 shares of Sycor's common stock, and Delta, N.V. securities will be convertible into $3 million of 6% preferred stock of Sycor.

Burroughs 9-Month Earnings Up

DETROIT – Burroughs Corp. has reported that net operating earnings for the nine months ending Sept. 30, increased 22% over the 1969 nine-month period. Reported net operating earnings for the nine-month period were $36.9 million, compared with 1969 net operating earnings of $30.2 million for the same period.

Net earnings per share were $2.14 compared with $1.83 per share last year.

Revenue for the nine-month period totaled $619.6 million, a 20% increase compared with $517.2 million in the 1969 period.

Third quarter net earnings were $11.6 million, a 21% increase over the 1969 third quarter earnings of $9.6 million. Per share earnings in the 1970 third quarter were 67 cents compared with 58 cents per share in last year's third quarter. Revenues for the third quarter were $216.8 million, a 3% increase compared with last year's third quarter of $165.9 million.

Total worldwide incoming orders for the third quarter were up 15% over last year's third quarter. Orders for the first nine months were 7% above the same period last year.

Commercial product orders showed an increase of 9% over the nine month period last year. Orders for government contract custom products declined 31% from last year's nine month position.

Orders for adding machine, calculating, accounting machine and commercial minicomputer product lines increased 8% for the period, while orders for commercial electronic data processing products, systems and services were up 11%.

Total worldwide backlogs are currently 9% greater than at the beginning of the year.

Statement Filed

Burroughs has also filed with the Securities and Exchange Commission a registration statement covering the proposed public offering of one million shares of common stock.

Kidder, Peabody & Co. Inc. and Lehman Brothers have been designated as comanagers of a nationwide underwriting group which will offer the shares to the public.

Initially, net proceeds from the proposed sale of common stock will be applied by Burroughs to the reduction of short-term debt.

... And Profits Still Shrink

Quarterly earnings reports from Honeywell and Sperry Rand each reflect shrinking profits.

In Minneapolis, Honeywell announced its third quarter profit had sagged 17% from last year, not including the newly acquired GE computer business, while in New York Sperry Rand, parent of Univac, revealed its second quarter profit had shrunk from $18.9 million in 1969 to $17.1 million.

Honeywell's third quarter profit fell to $11.4 million, or 71 cents a share, from $13.7 million, or 90 cents a share. Sales and rentals climbed, though, from $338.4 million to $345.5 million.

Honeywell compiled earnings of $40.3 million, or $2.57 a share, on sales of $1.09 billion for the first nine months of 1970, compared with profits of $39.8 million, or $2.65 a share, on sales of $1.01 billion in 1969.

Honeywell Chairman James H. Binger said information system product sales remained strong, while aerospace, defense, building controls, and industrial products have seen lagging demand.

The GE operations will be consolidated in the fourth quarter report.

Sperry Rand's per share profits for the quarter dropped to 50 cents, compared with 55 cents, on a slight rise in revenue from $400.3 million to $409.4 million. For the half, earnings are level at $34.2 million, or $1 a share, compared with $34.6 million or $1.01 a share in 1969.

First half revenue grew to $836.6 million from $809.7 million.

Sperry Rand President J. Frank Forster said his company's business "continued to experience the effects of the prolonged slowdown of the national economy."

Sci-Tek Schedules Demonstration Of Securities Validation System

WILMINGTON, Del. – A demonstration of a computerized system designed to minimize or thwart transactions in missing securities will highlight a seminar sponsored by the system's developer, Sci-Tek, Inc. on Oct. 28.

This seminar on Sci-Tek's Securities Validation System (SVS) will be presented to an invitational audience comprising managing partners of member firms of the New York and American Stock Exchanges and management representatives from the banking, insurance and financial community.

In announcing the seminar, to be held in the NYSE Board of Governors room, Sci-Tek President W. Henry du Pont noted that the Securities Validation System has now been endorsed by the two stock exchanges, the National Association of Securities Dealers, and the Joint Bank-Securities Industry Protection Committee.

SVS is conceived as a central data file of missing and stolen securities, maintained by identification number and constantly updated.

"The essence of SVS operation is its almost instantaneous responsiveness," du Pont said. "This will permit validation of securities presented for sale or other use while the customer is still in the broker's or banker's office or at least before funds are disbursed."

SVS is intended to reinforce and supplement the tighter internal operating and security measures now being placed in effect in brokerage houses and banks throughout the country.

"After the system is operational," du Pont said, "we plan to institute a 90-day trial phase during which SVS subscribers may use the system at no cost."

Nerve center for the system is a Univac 1108 located in Wilmington. The computer is accessible by teletypewriter, telephone, or other standard terminal devices.

Computest Quarterly Earnings Climb 21%

CHERRY HILL, N.J. – Computest Corp. realized net income of $136,169, equal to 15 cents per common share, on sales of $2,360,038 for the three month period ended August 31.

This is contrasted with earnings of $112,270, equal to 12 cents per share, on sales of $1,868,072 for the comparable period of last year, representing a 21% increase in earnings and a 26% increase in sales.

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Stock Transfer Steps Streamlined

SAN DIEGO, Calif. – Southern California First National Bank is using a remote, on-line display system for stock transaction.

The system, incorporating three display terminals, was installed last July in the bank's Corporate Trust Division to help service some 50 companies for which the bank acts as transfer agent.

The display system is an integral part of a 2-1/2 year project, called Transfer, that is designed to streamline stock transfer operations of about 100,000 shareholders while improving the handling of customer records and bank information.

Three Terminals

Three Stromberg Datagraphix 1110 Charactron display terminals are installed in the bank's downtown head office, and linked by telephone lines to an IBM 360/40 computer located in the bank's DP center several blocks away.

Using the 1110s the bank loads shareholder certificate information previously recorded on ledger cards onto a disk master file through a teleprocessing program.

The system has virtually eliminated the tedious coding and posting process used in the old system, according to Vice-President Robert Vollmar.

Daily Update

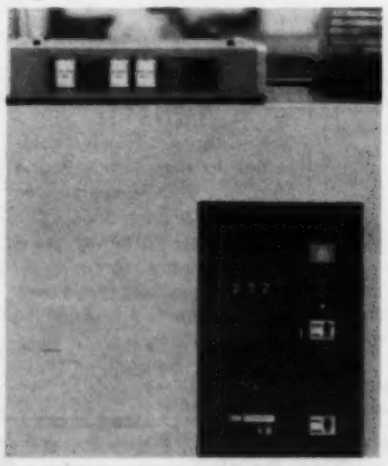
"We now save both time and labor besides being able to update records on a daily basis as opposed to once a week before. With these new computerized procedures, when a shareholder calls we can display his entire account information on the screen and give him an immediate response," he added.

In November, the Corporate Trust Division will begin the actual updating of stock certificates and name and address files of shareholders, along with the on-line input of daily transactions.

Why install a ROYCO 205/108 memory protector after you suffer a head crash?

The time to detect and prevent hard input/output errors or a disastrous computer memory head crash is *before* it happens. Not after your on-line computer has lost its memory. After all, your random access memory devices must be reliable. The penalty is a costly computer failure.

But, memory devices do fail. Remember, they're extremely close tolerance devices made and used by people. That's where we come in.



ROYCO 205/108 Head Crash Prevention System in Service Protecting an IBM 2314 Disc Drive.

Our ROYCO Model 205/108 Head Crash Prevention System will detect and prevent head crashes and hard input/output errors. It's a memory protector. That's it's job.

How does it work? Simple. The density of particles manufactured inside the memory system is continuously monitored. Internal particle concentration caused by aerodynamically unstable read/write heads, warped or damaged discs, edge loading or other malfunctions that affect head/memory surface operating tolerances is detected. Before it becomes critical. Before a head crash can occur!

The ROYCO Model 205/108 memory protector gives operators audible/visual warning and automatically retracts the heads if desired. To prevent hardware and data destruction. To avoid hard input/output errors. To hold computer downtime *down*.

That's positive protection. That's what the ROYCO 205/108 memory protector is all about. Besides at $49.50 a month you can't afford to be without it.

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Bechtel to Establish Affiliate Offering Time-Sharing Services

SAN FRANCISCO – Bechtel Corp. has established a new affiliate, Pacific International Computing Corp. (PIC), with headquarters in San Francisco.

The new company will offer a range of computer services to Bechtel clients and other professional and industrial firms.

According to S.D. Bechtel Jr., president of the parent construction company: "The new company was created to expand our computer capabilities to outside users, and to provide the flexibility to be responsive and competitive in the computer services industry."

Starting immediately, Pacific International is offering outside clients computer time, time-sharing, and professional services. Among the initial areas that PIC is developing for expansion of services are: text editing, contract writing, accounting and payroll packages.

Bechtel has been working with DP systems since the mid-1950s. The 200-man computer staff handles a GE 635, an IBM 360/50, three Honeywell 120s and two GE 105s.

Pacific International will also provide Bechtel's divisions and services with systems and programming services, and all internal operations will be transferred by Jan. 1, 1971 to the wholly owned affiliate.

Acquisitions

The board of directors of **Data Management Services, Inc.** has announced that majority control will not be sold to **Wabash Magnetics, Inc.** as previously indicated. The board has reached an agreement in principle with a group of businessmen to acquire majority control of the company from the principal shareholders and the corporation.

Computing and Software, Inc. (C&S) has acquired **CIU Compu-Credit Corp.**, Chicago, and its divisions, **CAC Diversified** and **Computers Internationale, Unlimited**, for an undisclosed amount of C&S common stock.

CIU provides computerized accounts receivable management and collection services and proprietary financial and statistical information packages.

C&S operates computing centers, provides computer-related marketing services, and manufactures peripheral components.

Automatic Data Processing, Inc. (ADP) has completed the previously announced acquisitions of **Computer Data Prep, Inc.**, Stamford, Conn., the Houston center of **Petro-Chem Computing, Inc.**, and **Keystroke Services, Inc.**, Atlanta, Ga.

Information & Computing Centers Corp., (ICCC), Dallas, has agreed in principle to acquire 80% of **CBS, Inc.**, Midland, Texas, through an exchange of securities. ICCC has sold **Service Systems, Inc.**, a wholly owned subsidiary, to a group headed by Dr. Michael D. Fremming, former ICCC board chairman.

The board of directors of **Prentice Electronics Corp.** has approved the acquisition of the business and certain assets of **MBI Inc.**, Palo Alto, Calif. MBI manufactures data communications and telecommunication products.

The presidents of **Electronics Associates, Inc.** (EAI), and **Computer Efficiency, Inc.** (CEI) have approved in principle the combination of the two companies on the basis of the exchange of 1.1 shares of CEI common stock for each one share of EAI common.

The form of the combination is to be determined. The transaction is subject to the approval of the boards of directors and shareholders of both companies. CEI, based in Hauppauge, N.Y., sells software products and manufactures peripheral equipment.

Dynamic Computer Systems, Inc. and **Aviation Activities, Inc.** both of Houston, have agreed in principle to merge. DCS, Inc. will be the name of the surviving corporation. The merger is subject to approval by stockholders of the two corporations. Dynamic Computer Systems provides software systems and facilities management; Aviation engages in aviation repair and maintenance.

Lear Siegler, Inc. (LSI) has purchased a majority interest in **Applied Computer Time Share, Inc.** (Acts), Southfield, Mich. Details of the cash transaction were not disclosed. Acts offers scientific time-sharing and commercial DP services.

Systems for Advanced Information, Rumford, R.I., software company, has sold the business, assets, and properties of its Wethersfield, Conn., office to **CBT Corp.**, parent holding company of the Connecticut Bank and Trust Co. CBT Corp. has established a subsidiary, CBT Data Services Corp.

Caldwell Computer Corp., Dallas, has agreed in principle to acquire **Brewer Corp.**, Fort Worth, for an undetermined amount of Caldwell common stock. Brewer Corp. manufactures and markets construction equipment for the electric and telephone utilities.

KDI Corp., Cincinnati, has agreed in principle to acquire **Cherne Industrial, Inc.**, Hopkins, Minn., a supplier of sewage treatment laboratory test equipment.

Madjac Data Co., Inc. has acquired **I.&A. Stationery Corp.**, Rego Park, N.Y., for an undisclosed sum.

Syner-Data, Inc., Beverly, Mass., has terminated acquisition negotiations with **Datac Computer Corp.**, Minneapolis.

Ultronics Systems Corp., Moorestown, N.J., has acquired **Novar Corp.**, Mountain View, Calif.

Stockholders of **Delta Data Systems, Inc.**, **National Institutes of Computer Professions**, and **Computer Marketing Industries**, have approved the merger of the firms into Delta Automated Systems, Inc., with headquarters in Kensington, Md.

National Cash Register Co. has acquired the **Appleton Coated Paper Co.**, Appleton, Wis., which becomes a wholly owned subsidiary of NCR.

Tracor Data Systems has acquired 36% of the common stock of **Remcom Manufacturing Co.**, Dallas, a subsidiary of Remcom Systems, Inc. Tracor has warrants for the acquisition of an additional 20% over a three-year period, and an option to purchase the remaining common stock of the terminal manufacturer during 1973.

Tracor has reached an agreement in principle with **Datamark, Inc.**, Westbury, N.Y., a manufacturer of line printers, to acquire essentially all assets, business, and products of Datamark.

The transaction, subject to approval of Datamark shareholders, would involve an undisclosed amount of Tracor common stock. Datamark would become part of Tracor Data Systems, Tracor's computer hardware subsidiary.

TRADE*QUOTES

Computerworld Stock Trading Summary

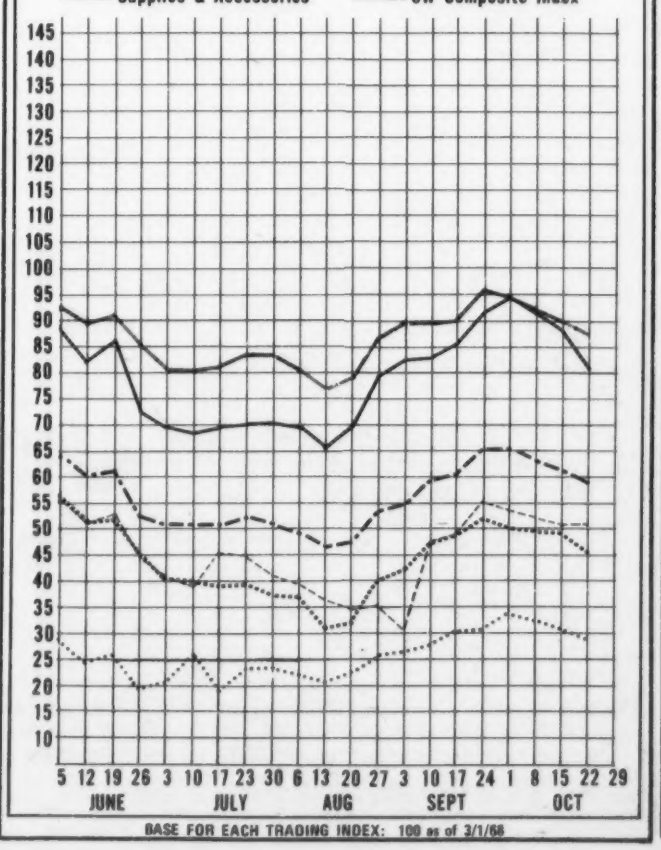
All statistics compiled, computed and formatted by TRADE*QUOTES Division of National Information Services, Inc. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, OCTOBER 22, 1970

EXCH		1970 RANGE (1)	CLOSE OCT 22 1970	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	2 1/4	- 5/8	-21.7
A	APPLIED DATA RES.	4- 24	6 5/8	- 1/2	-7.0
O	APPLIED LOGIC	2- 19	1 5/8	0	0.0
O	ARIES	1- 8	2 3/8	+ 3/8	+18.7
A	AUTOMATIC DATA PROC	23- 47	39 1/8	-1 3/8	-3.3
O	AUTO SCIENCES	3- 14	6	+ 1/4	+4.3
O	BRANDON APPLIED SYS	1- 9	1 1/4	+ 1/4	+25.0
O	COMPUTER AGE INDUS.	1- 3	1 1/2	0	0.0
O	COMPUTER ENVIRON	3- 14	2 1/2	0	0.0
O	COMPUTER INDUS.	2- 10	6 1/2	- 1/2	-7.1
O	COMPUTER NETWORK	3- 14	4	- 1/4	-5.8
O	COMPUTER PROPERTY	5- 15	6 1/4	+ 3/4	+13.6
N	COMPUTER SCIENCES	6- 311	11 1/8	- 5/8	-5.3
O	COMPUTER USAGE	2- 8	3 3/4	- 1/4	-6.2
A	COMPUTING & SOFTWARE	16- 75	31 5/8	0	0.0
O	COMRESS	2- 10	2 5/8	- 1/4	-8.6
O	COMSHARE	3- 15	4 3/8	- 1/8	-2.7
O	CONSOL. ANAL. CENT.	1- 3	1 1/4	- 1/8	-9.0
O	DATA AUTOMATION	1- 24	1 7/8	- 1/4	-11.7
O	DATA PACKAGING	5- 29	7 3/4	- 1/4	-3.1
O	DATAMATION SERVICE	1- 6	1 1/2	- 3/4	-33.3
O	DATATAB	5- 9	4 1/2	0	0.0
O	DIGITEK	2- 5	1 1/2	0	0.0
O	EDP RESOURCES	5- 13	8	- 1/2	-5.8
A	ELECT COMP PROG	3- 11	4 1/4	- 3/4	-15.0
O	ELECTRONIC DATA SYS.	31-161	57 1/2	+ 1/2	+0.8
O	INFORMATICS	4- 21	7 3/4	- 1/4	-3.1
A	ITEL	6- 26	15 7/8	- 3/8	-2.3
O	LEVIN-TOWNSEND SERV.	1- 13	2 1/2	- 1/2	-16.6
A	MANAGEMENT DATA	8- 25	10 7/8	- 1/8	-1.1
O	NAT COMP ANALYSTS	1- 8	3 1/4	+ 3/8	+13.0
O	NAT.COMP. SERV.	3- 12	4 3/4	- 1/2	-9.5
N	PLANNING RESEARCH	13- 54	20 3/4	-2 1/2	-10.7
O	PROGRAMMING METHODS	9- 27	15 1/2	-1	-6.0
O	PROGRAMMING & SYS	2- 5	2 1/4	0	0.0
O	PROGRAMMING SCIENCES	2- 33	1 5/8	- 3/8	-18.7
N	SCIENTIFIC RESOURCES	2- 22	4 1/4	- 3/4	-15.0
O	SOFTWARE SYSTEMS	1- 2	3/4	0	0.0
O	TBS COMPUTER CENTERS	4- 27	4 1/2	- 1/2	-10.0
O	UNITED DATA CENTER	2- 4	2 3/4	0	0.0
N	UNIVERSITY COMPUTING	14- 99	28 5/8	-2 3/4	-8.7
A	URS SYSTEMS	5- 21	6 3/4	-1	-12.9
O	U.S. TIME SHARING	3- 14	5 1/2	- 1/2	-8.3
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	21- 62	27 7/8	-2	-6.6
O	ALPHANUMERIC	2- 15	4 1/8	- 5/8	-13.1
N	AMPEX CORP	13- 48	17 1/4	-1 1/2	-8.0
A	ASTRODATA	4- 34	7 7/8	0	0.0
O	BOLT,BERANEK & NEW	3- 11	8 1/4	- 1/8	-1.4
N	BUNKER-RAMO	6- 14	9 1/2	- 1/2	-5.0
A	CALCOMP	11- 33	26 3/8	-1 1/4	-4.5
O	COGNITRONICS	3- 13	8 1/2	- 3/8	-4.2
O	COLORADO INSTRUMENTS	4- 13	7 1/2	0	0.0
O	COMPUTER COMMUN.	5- 36	9 1/2	-1 1/2	-13.6
A	COMPUTER EQUIPMENT	4- 12	4 3/4	- 1/4	-5.0
A	COMPUTEST	14- 28	16 3/8	-2 1/8	-11.4
A	DATA PRODUCTS CORP	5- 26	8	- 7/8	-9.8
O	DATA TECHNOLOGY	4- 23	4 1/4	- 1/2	-10.5
O	DIGITRONICS	4- 13	4 1/2	- 1/2	-10.0
N	ELECTRONIC M & M	7- 40	9 1/8	-1 1/2	-14.1
O	FABRI-TEK	3- 8	3 1/2	- 1/8	-3.4
O	FARRINGTON MFG	2- 17	2 7/8	- 5/8	-17.8
O	INFORMATION DISPLAYS	4- 20	7 1/2	+ 1/4	+3.4
A	MARSHALL INDUSTRIES	14- 67	25 3/8	-2 5/8	-9.3
A	MILGO ELECTRONICS	15- 42	32	-2 5/8	-7.5
N	MOHAWK DATA SCI	19- 87	32 1/8	- 5/8	-1.9
O	OPTICAL SCANNING	11- 52	17	-1	-5.5
O	PHOTON	4- 17	9	- 3/8	-4.0
O	PHOTO-MAGNETIC SYS.	1- 4	1 3/8	+ 1/8	+10.0
A	POTTER INSTRUMENT	15- 42	31 3/8	-1 3/4	-7.5
O	PRECISION INST.	6- 25	9	- 1/2	-5.2
O	RECOGNITION EQUIP	13- 83	17	-1 1/2	-8.1
O	REDCOR CORP.	4- 34	5 3/8	- 3/8	-6.5
N	SANDERS ASSOCIATES	7- 29	13 5/8	- 1/8	-0.9
O	SCAN DATA	6- 53	5 7/8	- 3/8	-6.0
O	TALLY CORP.	10- 23	15 3/4	- 1/4	-1.5
N	TELEX	10- 25	21 7/8	+ 7/8	+4.1
O	VIATRON	2- 51	4 1/4	-1 1/8	-20.9
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 15	13 1/4	+ 1/8	+0.9
O	BALTIMORE BUS FORMS	9- 21	7 1/2	-1 1/2	-16.6
A	BARRY WRIGHT	6- 25	8 7/8	- 3/8	-4.0
A	DATA DOCUMENTS	15- 35	18 1/8	- 7/8	-4.6
N	ENNIS BUS. FORMS	11- 19	10 3/4	-1	-8.5
O	GRAHAM MAGNETICS	5- 10	9 3/4	+2	+25.8
O	GRAPHIC CONTROLS	7- 17	7 3/4	-1 1/4	-13.8
N	MEMOREX	46-166	79 1/4	-2 5/8	-3.2
N	3M COMPANY	71-114	89 1/8	- 3/4	-0.8
O	MOORE BUS. FORMS	27- 38	33 3/4	- 1/4	-0.7
N	NASHUA CORP	21- 43	29	- 3/8	-1.2
O	REYNOLDS & REYNOLD	25- 48	36 1/4	-1 1/2	-3.9
O	STANDARD REGISTER	17- 30	18	+ 1/4	+1.4
N	UARCO	22- 39	25 5/8	- 7/8	-3.3
A	WABASH MAGNETICS	7- 30	9 7/8	- 1/2	-4.8
O	WALLACE BUS FORMS	25- 41	36 1/2	0	0.0
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	112 3/8	-4 1/2	-3.8
N	COLLINS RADIO	9- 37	15 7/8	- 7/8	-5.2
N	CONTROL DATA CORP	30-122	44 1/2	-3 3/4	-7.7
A	DIGITAL EQUIPMENT	50-124	66 3/4	-8 1/4	-11.0
N	ELECTRONIC ASSOC.	3- 11	4 5/8	- 5/8	-11.9
A	ELECTRONIC ENGINEER.	3- 14	4 5/8	-1 3/8	-22.9
N	FOXBORO	18- 39	23 1/2	-2	-7.8
O	GENERAL AUTOMATION	9- 42	13	0	0.0
N	GENERAL ELECTRIC	60- 86	85 1/8	+ 5/8	+0.7
N	HEWLETT-PACKARD CO	19- 45	27 1/4	- 3/8	-1.3
N	HONEYWELL INC	65-152	78 1/2	-6 1/8	-7.2
N	IBM	223-387	288	-5	-1.7
N	NCR	30- 86	37 1/2	-3 1/8	-7.6
N	RCA	18- 34	23 3/4	+ 5/8	+2.7
N	RAYTHEON CO	16- 33	21 3/8	-1 5/8	-7.0
O	SCI. CONTROL CORP.	1- 8	2 1/8	- 1/2	-19.0
N	SPERRY RAND	19- 40	24 1/4	-2 1/8	-8.0
A	SYSTEMS ENG. LABS	10- 49	18 1/4	-1 3/4	-8.7
N	VARIAN ASSOCIATES	9- 29	14 1/8	-1 7/8	-11.7
A	WANG LABS.	18- 51	33	-2	-5.7
N	XEROX CORP	66-115	85	-2	-2.2
	LEASING COMPANIES				
O	BOOTHE COMPUTER	8- 25	13	+ 3/4	+6.1
O	BRESNAHAN COMP.	3- 9	3	- 1/8	-4.0
O	COMPUTER EXCHANGE	2- 8	5 1/4	- 1/8	-2.3
O	COMPUTER LEASING	3- 18	3	0	0.0
N	DATA PROC. F & G	6- 32	13	-1 1/4	-8.7
O	DATRONIC RENTAL	2- 8	3 3/4	0	0.0
A	DEARBORN COMPUTER	10- 24	19 1/8	+ 1/4	+1.3
O	DIEBOLD COMP. LEAS.	2- 8	3 3/4	- 1/8	-3.2
A	DPA, INC.	3- 10	4 7/8	- 1/2	-9.3
A	GRANITE MGT	7- 22	10 5/8	-1 1/4	-10.5
A	GREYHOUND COMPUTER	5- 44	7 1/2	-1	-11.7
N	LEASCO DATA PROC.	7- 30	12 3/8	-1 7/8	-13.1
O	LECTRO COMP LEAS	2- 9	3	- 5/8	-17.2
A	LEVIN-TOWNSEND CMP	3- 19	5 7/8	- 3/8	-6.0
O	LMC DATA, INC.	1- 3	1 1/2	+ 1/8	+9.0
O	MANAGEMENT ASSIST	1- 4	1 3/8	- 1/8	-8.3
O	NCC INDUSTRIES	3- 8	4 1/2	- 1/8	-2.7
O	SYSTEMS CAPITAL	1- 8	3	0	0.0
N	U.S. LEASING	3- 19	13 3/4	0	0.0

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

COMPUTEST CORP.
Three Months Ended August 31

	1970	1969
Shr Ernd	$.15	$.12
Revenue	2,360,038	1,868,072
Earnings	136,169	112,270

SANDERS ASSOCIATES INC.
Year Ended July 31

	a1970	1969
bShr Ernd	$.17	.....
Revenue	173,595,000	$187,122,000
bEarnings (Loss)	782,000	d(1,951,000)

a-Preliminary. b-Includes contribution from Navy pricing settlement. d-Loss; includes loss from government contracts adjustments.

DIGITEK CORP.
Three Months Ended August 31

	1970	1969
Revenue	$144,812	$490,000
Loss	110,073	42,000

BURROUGHS CORP.
Three Months Ended Sept. 30

	1970	1969
Shr Ernd	$.67	$.58
Revenue	216,825,000	165,931,000
Earnings	11,559,000	9,577,000
9 Mo Shr	2.14	1.83
Revenue	619,594,000	517,229,000
Earnings	36,884,000	30,242,000

COMPUTER TECHNOLOGY INC.
Three Months Ended Sept. 27

	a1970	a1969
Shr Ernd	$.13	$.06
Revenue	8,735,000	8,130,000
Earnings	705,000	341,000
9 Mo Shr	.....	.18
Revenue	27,837,000	22,414,000
Spec Chg	b1,245,000	.....
Earnings (Loss)	(3,403,000)	1,030,000

a-Adjusted to exclude operations of a subsidiary, Service Technology Corp., sold in March. b-Start-up costs on subsidiaries.

RAYTHEON
Three Months Ended Sept. 27

	a1970	b1969
Shr Ernd	$.63	$.65
Revenue	298,624,000	316,730,000
Earnings	9,254,000	9,817,000
9 Mo Shr	1.81	1.81
Revenue	923,042,000	949,947,000
Earnings	26,988,000	27,288,000

a-Company has made no provision for possible losses on investment in Visual Electronics Corp. b-Restated to reflect the acquisitions of United Engineers & Constructors Inc. in Dec. 1969, and Caedmon Records, Inc., in May, 1970 on a pooling-of-interests basis.

GENERAL ELECTRIC CO.
Three Months Ended Sept. 30

	a1970 (000)	1969 (000)
Shr Ernd	$1.16	$.99
Rev	2,287,344	2,245,139
Earnings	105,795	90,233
9 Mo Shr	1.78	2.86
Rev	6,158,329	6,506,612
Earnings	161,470	259,122

a-Results for the first nine months reflect the effects of the strike which ended during February.

IBM
Three Months Ended Sept. 30

	1970 (000)	1969 (000)
Shr Ernd	$2.27	$2.13
Rev	1,914,001	1,778,392
Earnings	259,893	241,215
9 Mo Shr	6.51	6.04
Rev	5,508,439	5,294,777
Earnings	742,272	684,691

BARRY WRIGHT CORP.
Three Months Ended Sept. 30

	1970	1969
Shr Ernd	$.08	$.20
Revenue	6,352,009	a7,655,240
Earnings	131,234	346,854
9 Mo Shr	.43	b.67
Revenue	21,378,106	a23,821,488
Spec Cred	.....	c728,009
Earnings	739,667	e1,875,509

a-From continuing operations. b-Based on income before special credit. c-Primarily from sale of investment. e-Equal to $1.09 a share.

RCA CORP.
Three Months Ended Sept. 30

	a1970 (000)	b1969 (000)
Shr Ernd	$.16	$.59
Rev	805,000	846,000
Earnings	12,100	40,800
9 Mo Shr	.75	1.59
Rev	2,380,000	2,470,000
Earnings	54,400	110,600

a-Results for the third quarter were adversely affected by a 101 day strike. b-Restated by company.

PIONEER SYSTEMS INC.
Three Months Ended August 31

	1970	1969
Shr Ernd	$.13	$.07
Revenue	7,695,000	10,507,000
Earnings	349,000	193,000
9 Mo Shr	.48	.54
Revenue	28,621,000	33,036,000
Earnings	1,366,000	1,550,000

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Applied Data Research, Inc./Route 206 Center/Princeton, New Jersey 08540/Telephone: 609-921-8550